

# AUTOMOTIVE INDUSTRIES

## The AUTOMOBILE

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For the manufacturer of automobiles (either passenger or commercial car), true engine value lies in a combination of assured performance and a moderate price that will allow him a wider spread to obtain more balanced value in the other elements of his car.

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# Lycoming

## MOTORS

# Federal Bearings



**Microphotograph of the Babbitt Lining of a Federal Bearing—Enlarged 100 Diameters**

This picture graphically illustrates the extra close, even grain, the dense crystallization, the fine structure and absolute uniformity which make Federal Bearings so superior in wearing quality and toughness.

This finer crystallization in the Babbitt Lining of Federal Bearings is due to the rapid rate of cooling—which prevents the large and uneven crystallization so noticeable in the bearing pictured below.

## Special Qualities of Federal Bearings Due to Patented Centrifugal Force Process

**T**HE Babbitt Metal of Federal Bearings is distributed over the bronze backs under great pressure—the pressure of Centrifugal Force.

The process is completely automatic—thus eliminating the chance for human error and resulting in an unusual degree of uniformity, one bearing with another and each bearing throughout its entire structure.

The pressure under which the Babbitt Metal is distributed eliminates air in the Babbitt, and Federal Bearings are therefore guaranteed free from porosity.

Another advantage in Federal Bearings is the fact that the linings adhere to the backs throughout the whole life of the bearing—because the bonding alloy is at the correct temperature during the lining process and because the Babbitt Metal is forcibly pressed against the bonding alloy by the action of Centrifugal Force.

The extraordinary toughness of Federal Bearing Linings is due to the fact that the Bearings are chilled—thus resulting in a bearing surface with unusual powers of resistance.

Every Federal Bearing is uniform in texture, unusually close grained (as the microphotograph above shows) and unusually tough. Federal Linings do not flake off—they resist wear evenly and for the maximum life of a bearing.

Bearings are the most wear-subjected parts in your motor—thus the reputation for stamina of your motor depends upon the quality of the bearings you use. Build this reputation into your motors—by using Federal Bearings. Our engineers are at your service with reference to your bearing requirements. Write for details.



**Microphotograph of a Bearing Used by a Well-known Automobile—Enlarged 100 Diameters**

Notice the large and uneven crystallization as compared with the Federal Bearing pictured above. This bearing is uneven in structure and diverse in texture—it will show wear quickly in spots—in other words, will flake off under frictional pull.

The structural and physical defects shown in this microphotograph are not visible to the naked eye—and while it looks like a good bearing upon casual inspection, a microscopic analysis shows that it is not.

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**BABBITT-LINED BRONZE-BACK BEARINGS. BRONZE BUSHINGS. BRONZE CASTINGS**  
**DETROIT — MICHIGAN**



# AUTOMOTIVE INDUSTRIES

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VOL. XLVII

NEW YORK—THURSDAY, AUGUST 3, 1922

No. 5

### What We May Expect if Rail and Coal Strikes Continue



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# California Railroads Seek to Crush Highway Transport

Boycotts and specious propaganda based on contention motor vehicles don't pay fair share of road costs. Would give railroad commission power to force trucks and buses out of competition.

**L**OS ANGELES, Cal., July 28.—Indications now are that California will be the scene of a titanic transportation struggle between the heretofore impregnable rail carriers and motor transportation.

Forces on both sides will be massed, although in the early stages every advantage will be with the rail operators because of their solidified front and tremendous financial power. The actual struggle is not likely to assume a rate-slashing aspect as the rail carriers have tried that and failed. Neither will it be a battle for business, as that also has been undertaken in the past with similar results.

The political arena will witness the staging of this encounter. Already both sides are making plans, as the nominating election will be held Aug. 29. Eighty members of the state Assembly and twenty of the Senate will be chosen at the final election in November, but the primaries will witness the first attacks. Efforts are being made to pledge every candidate for a legislative office.

The railroads in this state undoubtedly have felt financially the effect of motor competition. With the advent of motor carriers, they no longer rule transportation. They have to face competition that last year, it is estimated, carried 10,000,000 passengers and an enormous freight tonnage. In many instances motors provided passenger and freight transportation to points not served by the rail lines, but in a vast majority of cases there was direct competition.

Trucks and stages have grown in favor with the public because of convenience. There is practically no difference in rates for either passengers or freight, as this state has a Railroad Commission which regulates these charges. The greater convenience of motor transport is evidenced by the fact that freight is delivered to points 100 miles distant from Los Angeles in six hours from the time it leaves the consignor's door. By rail two or three days would be required for the same service. Passenger trains serve the outlying districts three or four times each 24 hours, but stage service is twice that frequent.

There are some railroad officials who acknowledge that transportation is their business and that they must serve the public. These far-seeing men say rail methods should be revised to meet conditions but there are others, who apparently predominate, who maintain they can continue with present methods and crush motor transportation. It is because of the judgment of these that the struggle will come about. Already there are open breaches and hostilities have begun.

The principal plea of the railroads for public support is based on the contention that the people built the highways and have turned them over to stages and trucks for use to compete against the railroads without the state deriving

sufficient compensation. The railroads, as do all public utilities in California, pay 5.4 per cent of their gross income to the state in taxes and they want motor carriers compelled to pay the same. At the 1921 session of the Legislature this tax was raised to 7 per cent, but railroads have succeeded in obtaining an injunction and tying the case up in the courts so that collection of taxes has been prevented.

This 5.4 per cent tax is in lieu of all others. The rail carriers pay no direct tax on their right-of-way, rolling stock, or other equipment. Motor carriers pay a number of taxes, such as a state license, personal property, business tax in every town through which they pass, a garage tax, station tax, and many others. It is estimated that in some instances they aggregate between 15 and 20 per cent of the gross revenue.

Motor carriers meet the railroad argument that the public builds the highways for competitors by pointing out that the railroads use the highways also at every grade crossing and many city streets. They also call attention to the millions of acres of land grants that the railroads were given by the people. They don't overlook the fact, either, that in certain sections great oil holdings have developed on these land grants. These oil holdings have enabled the railroads to organize and own oil companies that are producing oil and gasoline used in motor vehicles, so that from their free land they obtain a big source of revenue from motor carrier competitors.

**C**ALIFORNIA is the second state in the Union in the value of its agricultural and horticultural products. A large part of the enormous tonnage developed from these sources is passed along by motor carriers to the railroads. Improved transportation facilities have brought about increased production. In this connection, about the only actual competition between the rail and motor carriers is when canned or crated horticultural products, or baled or sacked agricultural products are hauled from the canneries, packing houses and granaries direct to seaboard ports by trucks. This hauling has come about solely because trucks accomplish in a few hours what it requires rail carriers several days to do.

The Southern Pacific Railroad, which now is suffering from strike conditions at its shops in Roseville, stood in a position a few months ago to profit from methods invoked by the same striking employees. The Roseville Local of the United Brotherhood of Carpenters & Joiners of America and the Local of the Brotherhood of Railway Clerks undertook blacklisting and boycotting methods in opposition to motor carriers.

They established a "We Don't Patronize" ban on the Roseville-Sacramento stage line and notified members this



line had been put on the "We Don't Patronize" list. The body passed a motion to impose a fine of \$1 for the first offense and \$5 for the second and subsequent offenses if their members rode on the stages. Representatives of these railroad labor organizations visited the merchants of Roseville and sought to induce them to sign an agreement not to patronize freight trucks hauling freight for stores and others into Roseville and also not to patronize stages.

**T**HEY gave as the ground for this request that inasmuch as Roseville is a city largely supported by the railroad and that members of the various railroad forces are union men, it was to the advantage of the unions that the railroad should be patronized rather than the freight and passenger trucks. Merchants were told that unless they signed an agreement not to patronize motor carriers, employees of the railroad would be notified not to patronize them, and if employees did deal with the merchants, pressure would be brought to cause the dismissal of those employees from railroad service.

The attention of railroad officials was directed to this situation and it is reported that at first little cognizance was given the matter, but that later the officials claimed they could not be held responsible for the acts of employees.

The scene of attempted railroad influence against motor transport was next shifted to San Francisco. There was organized there what was known as the "Southern Pacific Good Service League" which, according to the May issue of the League's *Bulletin*, is an organization composed of men and women in the employ of the Southern Pacific Railroad. One of the principal objects of the League as presented in the *Bulletin* is "to assist in combatting unfair competition, such as auto truck and bus lines operating in territory served by our lines." This League petitioned the San Francisco Chamber of Commerce and other business organizations with a resolution which said:

"The League is an organization of Southern Pacific employees in San Francisco numbering approximately 6200 persons, and it asks business associations and their members to patronize railroads rather than the commercial auto bus and truck lines and to use their good graces in placing the highway carriers on an equal basis of taxation with the railroads. The employees feel that the continued inroads into the railroad business by the bus and truck lines which operate over the public highways almost tax-free, threatens their positions and decreased business will necessitate cuts into the railroads' working forces."

Another resolution was directed, strangely enough, to the Draymen's Association of California, an organization of motor truck owners, many of whom are such competitors as the resolution seeks to restrict. The resolution read as follows:

"WHEREAS: We, the members of the Southern Pacific Good Service League, are employees of the Southern Pacific Company in San Francisco, and

"WHEREAS: Our prosperity and the continued welfare of our families are dependent on the prosperity of the

Southern Pacific Company and the patronage of the Southern Pacific Company by the business men of San Francisco, and

"WHEREAS the following facts are true and of interest to the members of the Draymen's Association, to wit:

"(a) That the Southern Pacific Company is meeting severe competition under unjust conditions from commercial motor trucks and buses operating over the public highways virtually tax free as compared with the huge sums paid by the railroads to the State in taxes:

"(b) That taxes thus paid by the railroads are used in part to pay the bill for highway construction and maintenance, a cost that is steadily increasing because of the severe usage of the highways by said trucks and buses.

"(c) That continued unequalized competition by the highway carriers will so decrease the revenues of our company that its service to the public will be impaired and its purchase of supplies and its employment of working forces will have to be curtailed, thereby affecting the general prosperity of San Francisco and the State at large.

"That the Company's taxes in California based on 5¼ per cent of its gross receipts for 1920 were \$6,125,700;

"That the Company's annual purchases in San Francisco (actual for 1920) total \$17,731,800;

"That the Company's average payroll monthly in San Francisco (actual for 1920) is \$1,165,440.50;

"That San Francisco merchants and business men benefit from the Company's purchases and payroll expenditures in San Francisco.

"NOW, THEREFORE, BE IT RESOLVED: That, we the members of the Southern Pacific Good Service League appeal to the Draymen's Association and its members to patronize the railroads rather than the auto bus and truck lines and to use their good offices in bringing about a just basis of taxation

for the highway carriers which will place them on an equality with the railroads who not only have to maintain their own roadways, but in addition contribute large amounts through tax channels to the upkeep of public highways."

**A**NOTHER body to receive this resolution was the Motor Car Dealers' Association of San Francisco. The action of Southern Pacific employees brought about immediate response from the Dealers' Association, which incorporates in its membership all the leading truck distributors of Northern California. These dealers were so incensed that they appointed a committee to call upon the President of the Southern Pacific and ask the meaning of such action.

Without waiting for his verdict, however, several of them advised their factories they would accept no more shipments over Southern Pacific Lines. Some of them ordered carload shipments en route to San Francisco by Southern Pacific diverted to competing railroads. Los Angeles learned of this action and as there are close relations between the San Francisco Association and that in this city, some of the dealers here followed the same procedure.

A committee of the Dealers' Association called on the

**C**ALIFORNIA railroad interests are trying to kill off motor freight and passenger competition by means of insidious propaganda. They base their specious plea upon the old contention that motor vehicles do not pay their share of highway costs.

"Southern Pacific Good Service League" petitions all kinds of organizations, including Draymen's Association, to patronize railroads instead of highway carriers.

Railroad employees' boycotts another weapon used.

Referendum proposed on measure which would give Railroad Commission power to close highways to trucks.

This article tells in a straightforward manner the present status of a menacing situation.

Southern Pacific president, vice-president, passenger traffic manager, freight traffic manager and their assistants, and informed the railroad officials the Association looked with disfavor upon the propaganda of the Southern Pacific Good Service League.

After a discussion, President Sproule instructed the general manager of the operating and maintenance departments to instruct division superintendents that the Southern Pacific would not be a party to any kind of a boycott against the automobile industry and looked with disfavor upon any stand taken by employees that smacked of blacklisting. Motor transport advocates point out this action by Southern Pacific officials was not taken until after the dealers' representatives visited them.

The railroads of California derive in revenue approximately \$10,000,000 annually from shipments of automotive supplies. Dealers in various parts of the state have begun to awaken to their power if they turn against the railroads because of the position those carriers have taken toward motor competition.

The railroads are now charging \$4.66 per 100 lbs. for some types of motor vehicles from eastern points to Los Angeles. Water competition is entering a bid for this business, with a rate of \$1.50 per 100 lbs. This is a difference of \$3.16 on every 100 lbs. and if all motor vehicles were shipped by water instead of rail the average freight charge paid by purchasers of motor vehicles in this State could be more than halved.

Some dealers already have tried water shipping and say they found it quite satisfactory. Cars and trucks come through by water in approximately the same time as by rail. If methods were adopted whereby all shipping was by water, the loss to the rail carriers on cars and trucks alone, to say nothing of what would happen if the accessory dealers joined in the movement, would amount to many millions of dollars. This retaliatory method would be one of the strongest cards the industry could play.

As indicated by the statements of the Southern Pacific Good Service League, railway employees are imbued with the idea that motor competitors are responsible for the existing wage situation. In this instance they seem to have assumed the troubles of their employers, which records will show is quite a radical departure from custom.

In addition to boycotts and propaganda of both the spoken and printed kinds, a new line of attack was opened recently. Petitions are being circulated throughout the State favoring an initiative measure which would bring about an amendment to the constitution which would provide that the Railroad Commission have exclusive power to grant franchises for street, interurban and suburban railways and motor vehicle transportation of persons or property for compensation upon streets and highways, prescribe terms and conditions thereof, and regulate rates thereunder.

The active sponsor and supporter of this movement is the California Real Estate Association. To help boom real estate promotions, extensions of street car lines are necessary. Where these promotions take the form of town sites, the interurban lines are asked to put down

tracks and provide service. The street car and interurban companies have refused in many instances to make these extensions because of the probability of motor competition.

Signatures to the petitions are being paid for at the rate of five cents per name and in order to stimulate signatures solicitors have stands on all the principal corners, in the banks and many other buildings. Their slogan is "sign this petition and reduce street car fares." As a matter of fact, there is nothing in the petition to assure anyone of lower car fares but the public grabs the idea and is signing readily.

If this initiative measure became a law it would give the Railroad Commission authority to assume control of all the for-hire trucks and passenger cars in the State. Approximately 80 per cent of all trucks are in this class, as well as all stages and taxicabs. The Railroad Commission at this time controls motor vehicles operating in the intercity business but the new plan would apply to all others, except those used exclusively by the owner in his private business.

If the Commission were given this authority it would have the power to limit any truck to operation over certain streets and highways and prevent it being used elsewhere. It is felt that this would tend to destroy the mobility of the truck, which undoubtedly is its chief asset, because operations would be circumscribed.

The Commission could also fix rates to be charged by the owners of such vehicles and it is felt this would interfere with free

and unrestricted competition. If the plan became effective, some sort of a zoning system would have to be inaugurated and certain operators assigned to each zone. They would have no authority to leave that zone nor could any others accept business within it. The job cut out for the Commission under this plan would be tremendous, as routes would have to be established for approximately 30,000 trucks and several thousand taxicabs applying to many thousands of miles of streets and highways.

Under this proposal the Railroad Commission would have authority to bar motor vehicles entirely wherever it might see fit. When the Railroad Commission originally was given jurisdiction over intercity motor carriers, its authority did not include those lines in existence at the time, but the new proposition would apply likewise to these.

Railroad propaganda has been so effective throughout the State that Chambers of Commerce, real estate associations, and county supervisors have been influenced to adopt resolutions and petitions directed to the Railroad Commission asking that body not to grant any more franchises to motor carriers until such time as they are made to pay a bigger proportion of their revenue to the State for the privilege of using the highways.

Railroads have sent attorneys to many parts of the State to address various organizations in the endeavor to bring this about. Railroads have employees of local influence almost everywhere and never is an opportunity to restrict motor transportation overlooked.

**"WHAT will the automotive interests do to combat the railroads?" is the big question.**

**The battle must be fought out in the political arena. A united front must be presented if it is to be won.**

**Public interest in the controversy must be aroused and a counter fire of propaganda started before railroads can be forced to submit to fair competition.**

**The entire industry will be interested in this exposition of conditions in the state where motor transport has been most highly developed.**



With this situation existing, the big question becomes: "What will the automotive interests do to combat it?"

In looking about for an answer, the many complexities make the solution difficult to determine. The railroads are united, but truck interests are not. The most effective weapon has been the plan of withholding freight by automotive dealers from at least one rail carrier. There is no centralization of motor interests. With the exception of a few individual efforts, there has been no attempt to offset railroad propaganda because of lack of unification of ideas.

The public knows what motor vehicles do for California commercially but the public will not decide this issue. The state's highway commission, Motor Vehicle Department, supervisors, and other officials have singled out commercial vehicles for their attack on the ground that they damage the streets and highways. A multitude of sins in highway building is being covered by the assertion that trucks have caused a large proportion of the damage.

From the standpoint of public sentiment, it is doubtful if a very serious outcry would be made if all trucks were ordered off the roads. Of course this situation would change if trucks did stop because then the public would learn its almost total dependence on this type of transportation for food and building supplies.

This state of affairs has led interests friendly to motor transport to realize the battle must be taken into legislative halls. Practical politics must be applied by practical methods. It is now planned to get from every candidate for the legislature a statement as to his position on the right of motor carriers to use the highways.

These carriers are not asking and don't intend to ask for anything unreasonable. They are willing to accept a reduction in load limits which, on state highways, now is 30,000 lbs. They are willing to pay more for the privilege of using the highways, but they will not consent to being taxed out of existence. California has 57 counties. Under the state law each county has authority to reduce the weights allowed on state roads for application on county roads. More than a score of the counties have done this, so that the state is a patch-work of weight regulations.

Trucking interests ask for a uniform law above everything else. Unfortunately, however, they are not united on what this should be. The automobile clubs have gone on record as advocating a gross maximum limit not to exceed 22,000 lbs. The Truck Owners Association of Southern California, California Draymen's Association, the Dealers Association of San Francisco, the Los Angeles Dealers Association, and most of the owners of heavy duty equipment, advocate a limit of not less than 26,000 lbs. and permission to continue to operate trucks which, when loaded to their rated capacity, weigh in excess of that figure for the life of the equipment.

Knowing that weights, uniformity and tax will be the crux of the situation, the preliminary conflict will be waged at the polls and the battle subsequently carried to the legislature for determination. To influence the public at election time will require a vast amount of propaganda and at this time efforts of motor transport are woefully weak. They have a chance to win if they strengthen their forces, but, unless they do, they unquestionably will be defeated.

## Forest Products Laboratory Activities

**T**HE Forest Products Laboratory has recently issued a comprehensive program of the work it has planned for the fiscal year 1922-23, which contains much information of value to all users of wood products. Inasmuch as the automotive industry is a large user of wood, those in the industry concerned with the manufacture of bodies, wheels and other parts in which wood is employed can profit materially by following the work of the laboratory. The printed program referred to not only gives the plans for future work, but the status of work already in progress, together with a list of reports issued to date on the numerous subjects upon which research has been completed.

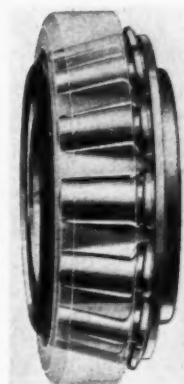
The work planned or in progress includes such items as the following, among many others: mechanical and physical properties of wood and the influence of moisture and other factors upon these properties, testing machines and methods, methods of wood bending, glues and gluing, study of the finishing of wood, study of relative efficiency of various types of kilns and auxiliary apparatus, air seasoning of wood, specifications for wood and wood products, etc.

The Association of Wood Using Industries is co-operating with the Forest Products Laboratory in much of its work and is endeavoring to have reports prepared in such a way as to make them understood by non-technical foremen and others who should profit by use of the information they contain. One subject in which this organization is especially interested is that of wood finishing, or the painting, staining, varnishing, etc. of wood products. A part of the program in this connection calls for the establishment of a class at the Forest Products

Laboratory to which manufacturers can send employees who will learn the fundamentals of finishing woods of different character and be encouraged to read the publications of the laboratory and other literature of similar character. The plan is, through education, to eliminate, in time, rule of thumb methods and substitute a more logical and scientific scheme of operations in the finishing department.

## Improved Cage for Bock Bearing

**T**HE Bock Bearing Co. has announced an improved form of cage to be used in the taper roller bearings which it manufactures. The cage and rollers are now assembled with the cone as one unit, the second unit of the complete bearing being the cup. There are thus but two units in the complete bearing instead of three units formerly used. This is said to make for greater convenience in handling and to leave less to the judgment of the mechanic who assembles the bearing in the axle or other part in which it is employed. The accompanying cut gives a phantom view of the Bock bearing and serves to show the form of the new type of cage.



*Bock taper roller bearing, showing new form of cage which is now standard.*

# Automotive Manufacturers Hold Same Views on Big Problems

Rather remarkable unanimity of opinion expressed on such important questions as prospective farm markets, trend of prices and effect of European situation on America.

**M**ANUFACTURERS in the automotive field are chiefly concerned at present with the all important problem of what effect the mine and rail strikes will have upon their business, but there are other big questions to which they are giving much thought. They include:

1. Is the harvest going to bring the farmer into the buying market?
2. Is the European situation holding back our permanent development more than we care to admit?
3. Have prices in general reached bottom or is another downward sag ahead?

Upon these subjects **AUTOMOTIVE INDUSTRIES** has obtained the views of representative manufacturers in the passenger car, truck and parts fields. In general, they manifest a rather remarkable unanimity of opinion on these fundamental problems. It is evident all of them are looking at the situation broadly and that they are eager to obtain the views of others not only in their own industry but in other lines.

"A detached viewpoint is a great thing," writes one engine maker. "Men with families generally see no faults in their own close groups but the neighbors are sure to discover the flaws. In business, leaders are generally so close to their own problems that they are blinded to both the limiting and determining factors.

"To-day, as never before, a detached viewpoint is necessary. More than ever, I believe, you and I must stand away from our businesses and view them with a critical, impartial eye. And, further, we must be keen to observe indications in all the other industries—indications which find their reflections in our own business.

"If I am to feel the pulse of the automotive industry, I must be able to sense and to properly interpret the activities in the steel, iron, coal, oil, leather and in all other lines of basic supplies.

"**A**LTHOUGH the automotive business finds itself once more in a healthy condition, this state has been achieved without the assistance of a healthy foreign outlet for merchandise. There are as many disturbing elements at work right now in the world as we have ever known. Business improves in spite of them.

"The question is will business continue to improve?

"Business just naturally must grow better from now on. But world adjustments must soon come to provide an outlet for surplus goods. The farmer is going to have cash in his back pocket this fall as the result of the coming and present harvest. People with money to spend are spending it—confidence has been restored in the face of the fact that all commodities are not yet where they should be in price."

Primary interest naturally centers in domestic demand

but automotive manufacturers are keenly alive to the fact that American prosperity is dependent in large measure upon the restoration of Europe to normal conditions. They seem to feel, however, that the return of the farmer to the market is more important at this juncture. Most of them are confident that there will be a return of purchasing in the agricultural districts next fall, but they have no exaggerated notions as to its volume.

A prominent manufacturer of axles believes "the present harvest will bring the farmer into the buying market for automobiles although I doubt if it will make him a heavy purchaser of farm implements. In my opinion the first money the farmer gets will be spent for an automobile and for that reason I look for a good farmer trade on the light, cheap cars."

"**T**HE present outlook is for a very large harvest of grains, fruits, undoubtedly a large crop of hogs, with an ample supply of beef cattle, and the time has gone far enough for us to feel more or less positive that the crops of the year 1922 are safe from any very grave danger," says a substantial truck maker. "This ample supply of farm products in the northern and western states means a great deal of new wealth for the country. The effect on the farm demand would be much greater this year if it were not for the existing hangover of debts contracted during 1920 and 1921, but it should revive the farmer's buying power and change his mood to that of a buyer, to some extent, as it will tend to bring a much more cheerful condition through the extinction of debts which have been hanging over the farmer's head for the past two years.

"To sum up, my opinion is that the farmer will again resume buying during the fall months, as he cashes his crops, but that this buying will probably be shadowed by ideas of economy, due to the lessons of the past two years. In other words, the farmer will buy what he really needs, and not be led into extravagances for the time being.

"There should be an increased demand for motor trucks late in the year from the farmer, as, by that time, the market will have been cleaned up of a large quantity of the models of 1920 and 1921 which have remained in the hands of the dealers in the agricultural territory."

On the subject of farm buying, the president of a New England company manufacturing electrical equipment says:

"I am of the firm opinion that the present harvest is going to bring the farmer into the buying market in a substantial way. I am not referring particularly to passenger automobiles, but rather over the wide range of merchandise which is necessary to the farmer's existence.

"To sum up the farm situation, the farmer never takes care of his equipment, which has always meant frequent replacement. A certain amount of equipment is absolutely



necessary for the working of his farm, and for two years he has bought practically nothing, so that, as soon as he gets the proceeds from this year's harvest, he must immediately start replacing his tractors, his farm engines, his pumps and all the other incidentals that he, of absolute necessity, must have.

**"THIS** will probably spread to a larger purchase of motor cars by the farmer this fall, but if the farmer himself really does not enter the motor car market as a prominent factor, the other equipment which he must purchase will result in at least a slightly increased demand for passenger cars."

Another parts maker says there is little question but that the present harvests will enable the farmer to enter the markets with a greater volume of business than for many months past. He points out that there has been a very substantial improvement in the farmer's situation, particularly in the Middle West and South, as reported by the field men of his company. Referring specifically to the South, he says:

"In the South, while the farmer in some cases has been troubled with altogether too much water and was forced to replant two or three times, this misfortune happened at such a time that, while adding to the expense of planting, the final planting was not too late to be productive of good results providing the weather conditions are favorable." It might be added parenthetically that weather conditions have been good since this opinion was expressed.

Only two or three of the twenty-five men whose views were obtained expressed any forebodings about an increase in the sale of automotive products in the great rural districts in the next few months. One of the dissenters, the secretary of an Indiana gear company, said:

"The present harvest will bring the farmer into the market to a certain extent only and the commodities which the farmer buys will be commodities that he needs more than he needs gasoline driven vehicles. The present price of gasoline is so high and the present price of feed is so low that I personally know a good many farmers in this vicinity who have put their tractors in the barn and are using horses. I don't feel, therefore, that the tractor market is going to be very good this year and I believe that the sale of trucks to farmers will not be on an extensive scale, although they will buy more than they have for the past year."

In considering the second great question, there is practical agreement that the European situation is holding back American development. Here are brief summaries of some of the opinions expressed:

"In my opinion, the European situation affects our return to prosperity more than is admitted throughout the larger part of the United States. I find the Eastern viewpoint reasonably agreed with this thought, but the Middle West does not accept it."

"The European situation is undoubtedly retarding our industrial expansion to a considerable extent, but it is not

a paramount influence in determining our own prosperity."

"The European situation can but be having an effect upon our permanent development, but not as serious as was anticipated by some economists."

"The European situation cannot help but hold back our permanent development, when it is taken into consideration that we are being deprived of approximately 50 per cent of our export market at this time."

"The European situation is, I believe, holding back real development more than we realize."

"I think the European situation is holding back our permanent development more than we care to admit. The sooner we come to the conclusion that we are not an isolated community, but are a part of the world, the better off we will be."

"The European situation is undoubtedly holding back our permanent development, although to what extent it is practically impossible to tell because of the many existing complications and unusual conditions."

"If official Washington would sidetrack politics long enough to work out a scientific tariff for this country which would neither permit dumping of low-priced merchandise nor yet put a tariff wall around us, the export situation would be very greatly improved."

"I do not believe the European situation is holding back our permanent development to a very large degree. There is so much work undone in this country that we can go along for some time if we devote ourselves to our domestic needs without any permanent ill effects, and in the meantime Europe will get cleaned up."

Taking up the subject of prices, it seems to be the consensus of opinion that in-

dustry must base its operations on a slowly falling market for a long period. It is not believed that there will be any radical or sudden changes, especially in the automotive field, but that the tendency of all prices, including labor, will be downward. Here are some of the opinions on this question:

"For some years to come we shall, broadly speaking, be in a declining period, and reductions of all kinds are consistent with economic observations of the past, provided these reductions are not such as to wipe out profits."

**"THERE** are a number of products, basic in their nature, such as iron, lumber and foodstuffs, which have reached prices which will not be appreciably lowered in the next five years; but there are a number of manufactured products, such as textiles, shoes and hardware, which undoubtedly will have to stand further deflation. Fortunately for the automotive industry, its deflation is nearly completed."

"Prices have not reached bottom; as large quantity production always permits of economies."

"Prices on the basic materials of the automotive industry reached their lowest point this year, and I do not think they will go lower."

"We believe the prices of some manufacturers have reached bottom, but other manufacturers have not made

**A**UTOMOTIVE manufacturers are thinking as never before of the bearing upon their own business of the big, vital problems which govern trade and industry as a whole. Automotive Industries has obtained the views of representative makers of cars, trucks and parts on these three important questions:

1. Will the harvest bring the farmer back into the market?
2. How much is the European situation holding back our development?
3. Have prices in general reached the bottom?

The views of these manufacturers are mighty interesting. They show a rather remarkable unanimity of opinion on all three subjects and for that reason are especially valuable.

very many cuts, and they should be in a position to make additional reductions."

"I feel that prices have not reached the bottom and won't for several years, and that the tendency will be continually down, with occasional increases such as we have had for the last sixty days or more."

"I believe prices have about reached bottom in the present cycle, and I maintain that we cannot have increasing prosperity until a stiffening of prices begins. This is already beginning to take shape in the primary markets."

"I do not believe that prices in general have reached the bottom if a long-time view of the situation is taken. We have before us a period of some years of steadily lowering prices, the progress of which may be so slow that it will not bring seasonal or marked reductions."

"I believe that we are still on a downward swing of prices. I don't believe the bottom will be reached until

1927 or 1928. A gradual reduction is the one thing that will keep our industry in a stable condition during this period."

"I look to see a more or less gradual drop in prices in this country and a gradual betterment of conditions in other countries until we get to a point where the differential is reasonable."

"I think that automobile prices, in general, have about reached the bottom."

Practically all the manufacturers are convinced that the country has before it a long period of reasonable prosperity. Forecasts for the immediate future are complicated by the strike situation, but with only two or three exceptions they predict a seasonal decline in automotive sales, regardless of the hampering influence of labor difficulties. Most of them predict that fall business will be better than it was last year but not so good as in the first half of 1922.

## U. S. Department of Agriculture—Bureau of Public Roads

### Federal Aid Status

Financial Statement as of June 30, 1922

STATES	Federal Aid Apportioned F.Y 1917 to 1922	Federal Aid Under Construction**	Available for New Construction	Federal Aid Completed††	Uncompleted Federal Aid on Projects Under Construction	Amounts Federal Aid Paid States	Balance Federal Aid Earned
Alabama.....	\$7,329,973	\$4,485,559	\$2,844,414	\$2,521,926	\$1,963,633	\$2,023,403	\$498,523
Arizona.....	4,824,633	3,449,798*	1,374,835	2,911,866*	537,932	2,706,621	205,245
Arkansas.....	5,874,072	4,420,402	1,453,670	3,799,457	620,945	3,291,482	507,975
California.....	10,846,453	7,931,166	2,915,287	5,719,194	2,211,972	3,856,186	1,863,008
Colorado.....	6,121,240	3,871,070	2,250,170	3,243,844	627,226	2,680,248	563,596
Connecticut.....	2,170,222	1,304,048	866,174	920,636	383,412	809,822	110,814
Delaware.....	813,280	735,655	77,625	462,055	273,600	461,548	507
Florida.....	4,036,938	2,872,155*	1,164,783	1,520,548	1,351,607	810,235	710,313
Georgia.....	9,405,536	7,618,839	1,786,697	6,934,550	684,289	6,678,707	255,843
Idaho.....	4,298,926	3,463,240	835,686	3,261,661	201,579	3,145,837	115,824
Illinois.....	15,270,548	11,425,553*	3,844,995	11,323,404*	102,149	11,093,043	230,361
Indiana.....	9,374,148	5,818,839	3,555,309	3,828,792	1,990,047	2,445,878	1,382,914
Iowa.....	10,042,216	8,722,711	1,319,505	7,645,029	1,077,682	5,604,936	2,040,093
Kansas.....	9,997,591	8,020,719	1,976,872	5,790,705*	2,230,014	4,597,477	1,193,228
Kentucky.....	6,787,243	4,710,498	2,076,745	3,592,490	1,118,008	2,838,897	753,593
Louisiana.....	4,739,514	3,798,558*	940,956	3,527,353*	271,205	3,083,184	444,160
Maine.....	3,341,124	2,836,214	504,910	2,296,779	539,435	1,861,223	435,556
Maryland.....	3,031,378	2,524,511	506,867	2,372,810	151,701	2,278,187	94,623
Massachusetts.....	5,148,741	3,336,506	1,812,235	2,680,558*	655,948	2,066,810	613,748
Michigan.....	10,210,828	7,182,693	3,028,135	5,050,393	2,132,300	4,477,186	573,207
Minnesota.....	9,938,980	8,922,574*	1,016,406	7,454,714	1,467,860	7,162,927	291,787
Mississippi.....	6,246,449	4,466,940	1,779,509	3,394,319	1,072,621	2,784,496	609,823
Missouri.....	11,770,204	6,040,434	5,729,770	3,637,968†	2,402,466	3,227,749	410,219
Montana.....	7,045,713	3,909,310*	3,136,403	3,562,603*†§	346,707	3,414,071	148,532
Nebraska.....	7,447,951	4,757,467	2,690,484	4,509,400	248,067	3,364,816	1,144,584
Nevada.....	4,480,713	1,869,900	2,610,813	1,581,123	288,777	1,258,303	322,820
New Hampshire.....	1,508,714	1,167,082	341,632	1,074,694	92,488	1,016,026	58,568
New Jersey.....	4,208,170	2,255,703	1,952,467	1,850,195	405,508	1,464,777	385,418
New Mexico.....	5,579,618	3,283,289	2,296,329	2,645,584*	637,705	2,214,206	431,378
New York.....	17,385,250	8,834,921§	8,550,329	4,546,815	4,288,106	3,403,340	1,143,475
North Carolina.....	7,980,025	6,134,672	1,845,353	5,960,877	173,795	5,308,161	652,716
North Dakota.....	5,387,202	3,613,888	1,773,314	2,976,305*	637,583	2,679,976	296,329
Ohio.....	13,025,952	8,113,405*§	4,912,547	7,386,461*†§	726,944	7,034,570	351,891
Oklahoma.....	8,090,585	5,533,700	2,556,885	3,964,534	1,569,166	3,550,571	413,963
Oregon.....	5,514,842	4,588,556	926,286	4,258,897	329,659	4,250,034	8,863
Pennsylvania.....	16,031,598	13,801,510*	2,230,088	12,384,763	1,416,747	11,244,455	1,140,308
Rhode Island.....	1,006,791	637,411	369,380	589,379	48,032	575,853	13,526
South Carolina.....	5,007,855	3,862,648*	1,145,207	3,070,984*	791,664	2,679,077	391,907
South Dakota.....	5,656,943	4,090,700	1,566,243	3,008,456*	1,082,244	2,573,570	434,886
Tennessee.....	7,875,830	6,726,906	1,148,924	3,747,311	2,979,595	2,757,207	990,104
Texas.....	20,525,577	15,242,320	5,283,257	12,086,142	3,156,178	9,637,560	2,448,582
Utah.....	3,966,624	2,510,177	1,456,447	1,674,758	835,419	1,135,997	538,851
Vermont.....	1,607,729	879,597	728,132	694,514	185,083	564,869	129,645
Virginia.....	6,908,559	4,964,149	1,944,410	3,882,103	1,082,047	2,323,766	558,337
Washington.....	5,075,385	4,259,009	816,376	4,053,149	205,860	3,929,289	123,860
West Virginia.....	3,724,864	3,402,341	322,523	2,846,732	555,609	2,431,279	415,453
Wisconsin.....	8,899,097	6,254,806	2,644,291	5,613,262	641,544	4,964,542	648,720
Wyoming.....	4,313,176	3,416,812	896,364	2,700,143	716,669	2,149,245	550,898
TOTALS.....	\$339,875,000	\$242,068,961	\$97,806,039	\$194,560,135	\$47,508,826	\$166,911,552	\$27,648,583

NOTE:—\*Reduction due to payment of final vouchers. †Correction. ‡Reduction due to withdrawal or cancellation of projects. §Difference due to revision of project statement or agreement estimates. \*\*Includes projects entirely completed. ††Includes completed portions of projects under construction.



# Hudson and Jewett Announce New Body Models

Hudson seven-passenger sedan has an aluminum body in which are incorporated numerous refinements and increased seating space. Jewett four-passenger coupe and roadster are also provided with ample space for both passengers and luggage.

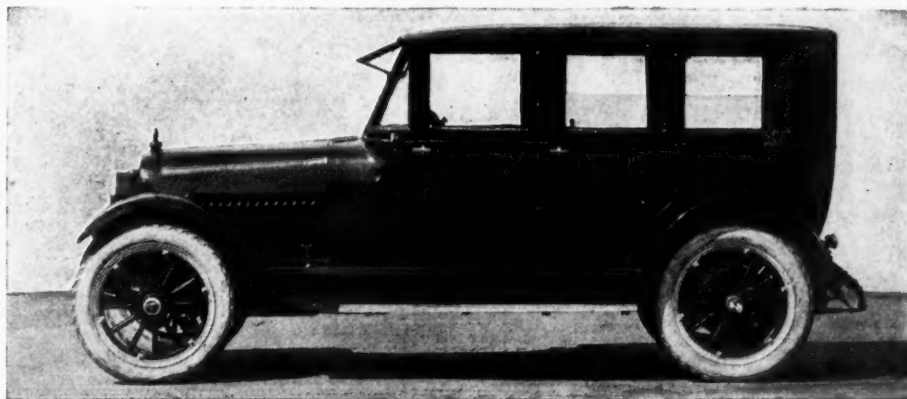
**A** NEW seven-passenger sedan with a body practically all of aluminum has been added to the line of the Hudson Motor Car Co. This body replaces the previous sedan and incorporates a number of changes. It is 3 in. lower, of lighter weight and has wider front and rear seats. All the body panels are of aluminum. The body is of Biddle & Smart manufacture. The 3 in. increased length has been given to both the front and rear compartments, particularly between the rear and auxiliary seats, to give greater knee room at this point. Additional space has also been given the driver and the front seat, designed along the general lines of the Hudson touring limousine, has been laid out to give greater comfort to the driver. The contour of all the other seats has also been changed, to afford an easier seating position, and the rear seat is deeper.

Better ventilation than on previous models is provided for by a larger cowl ventilator equipped with a deflector. The rear window glass is larger and the triangular panes of glass which form part of the windshield give the body a longer appearance and afford the driver a greater range of vision.

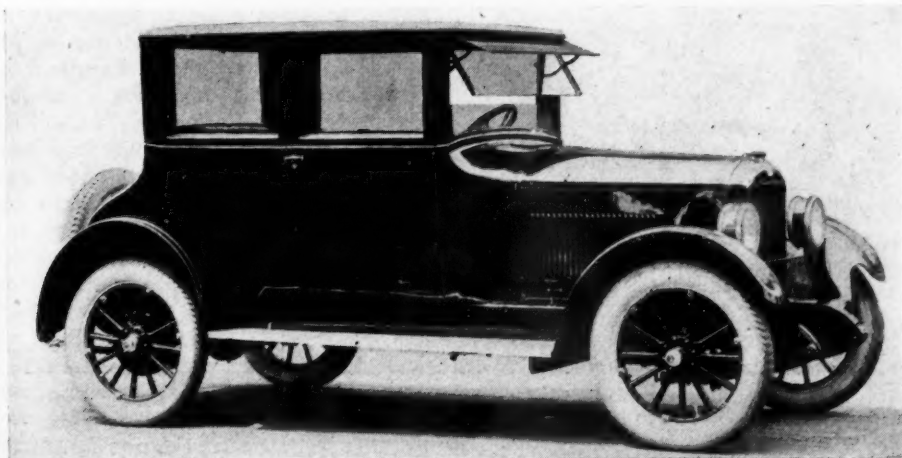
The upholstery on the new sedan and the floor rugs are of a deep blue color. The interior accessories include rear quarter shades, dome light with switch so located that it can be reached equally well from the front or rear compartment, smoking set, rear

vision mirror and other similar improvements. All the doors have four hinge supports, and entrance to the body has been facilitated by increasing the width of the doors. Drum type side parking lamps at the base of the windshield are also standard equipment on this body. The body panels are finished in valentine blue and the chassis parts are black. This car is priced at \$2,295.

**A** NEW coupe has been added to the Jewett line. It has been designed to give a full four-passenger capacity. The body is 48 in. wide and from the dash to the rear window measures 77½ in. It is claimed that the passenger space in this new Jewett coupe is almost as much as in the coupe on the big 6-66 Paige model. The two-



*New Hudson sedan body, seating seven, is largely constructed of aluminum*



*The new Jewett coupe which seats four passengers*

passenger rear seat is 36 in. wide by 19 in. deep.

For the fourth passenger, a well-upholstered folding armchair measuring 14½ x 14 in. is provided. This seat has 23¼ in. of leg room. There is a rear deck behind the coupe which provides space for several handbags. The coupe sells for \$1,395.

A roadster has also been one of the recent additions to the Jewett line. This has also been increased in roominess and now has a 45-in. seat and new side curtains. The curtains are tailored and tight fitting, giving complete protection from the weather with ample window space. There is also considerable space under the rear deck.

# Some Mechanical Details of French Grand Prix Racing Cars

High engine speed and failure of lubricating systems caused some eliminations. Roller bearings on crankshaft, exceptional streamlining, novel front axle and means for operating front wheel brakes are among the most interesting features of the winning Fiat car.

By W. F. Bradley

THE fast pace set by the Fiats was largely responsible for the failure of so many competitors in the recent French Grand Prix race. The three Sunbeams had shown themselves to be the fastest in practice until the Fiats appeared on the scene, when the English engineers decided to drop their gear ratio from 3.6 to 3.8. Made on the eve of the race, there was no time to try out the effect of this change, and the contest showed that the engines were running beyond the safety limit, for in each case a valve stem broke and caused withdrawal of the car.

Ballot claims that his cars raced with standard 2-litre chassis, specially streamlined. The best performance in this team was made by Foresti, who went 43 laps and was forced out, when holding third place, by reason of the failure of the lubrication system, which caused a bearing to run and broke a rod and a piston. Another Ballot was abandoned on the 18th lap with a broken connecting rod caused by inadequate lubrication.

The eight cylinder Rolland-Pilains proved to be green. Guyot went out on the third lap, when holding third place, with a broken crankshaft. Louis Wagner's car broke a connecting rod on the second lap. A fire started on Hemery's car on the seventh lap, and it was finally

abandoned after the flames had been extinguished.

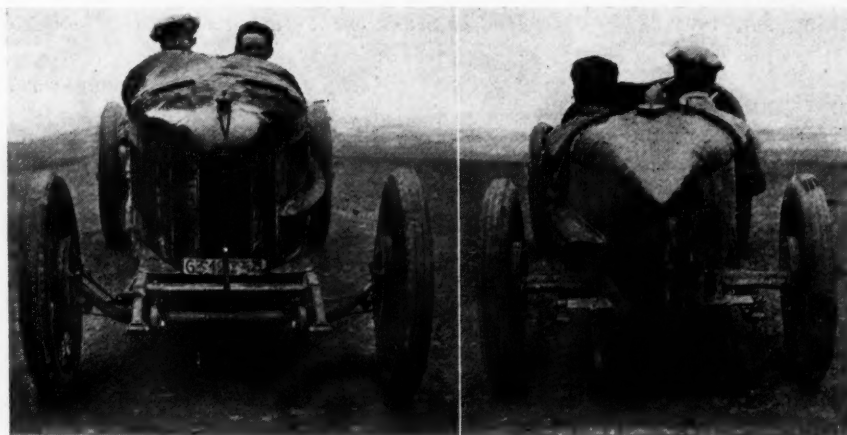
Bugatti came to the start with four cars equipped with a new type eight cylinder engine. Friedrich was the fastest of these drivers and succeeded in getting the lead for a few minutes on the third lap. On the 12th lap he went out by reason of the breakage of the gears in one of his two magnetos. These magnetos were mounted side by side on the dash and driven from the overhead camshaft by a universal joint shaft. When the magneto gears went they broke up the intermediaries. The three other

Bugattis went to the end, but they were never at any time serious contestants for first place. They were very liberally lubricated and smoked freely throughout the race.

The winning Fiat had no trouble whatsoever. Felice Nazzaro went through the race without lifting the hood of his car. During his one stop he took on gas and changed both rear tires. Bordino stopped twice for plug changes; he also took on oil during the race. On the 49th lap Bordino ran out of gas. On these cars the oil supply was in a dashboard tank behind the engine, and above this was a smaller tank in two compartments, one of which contained a gallon of gasoline and the other a small supply of kerosene for

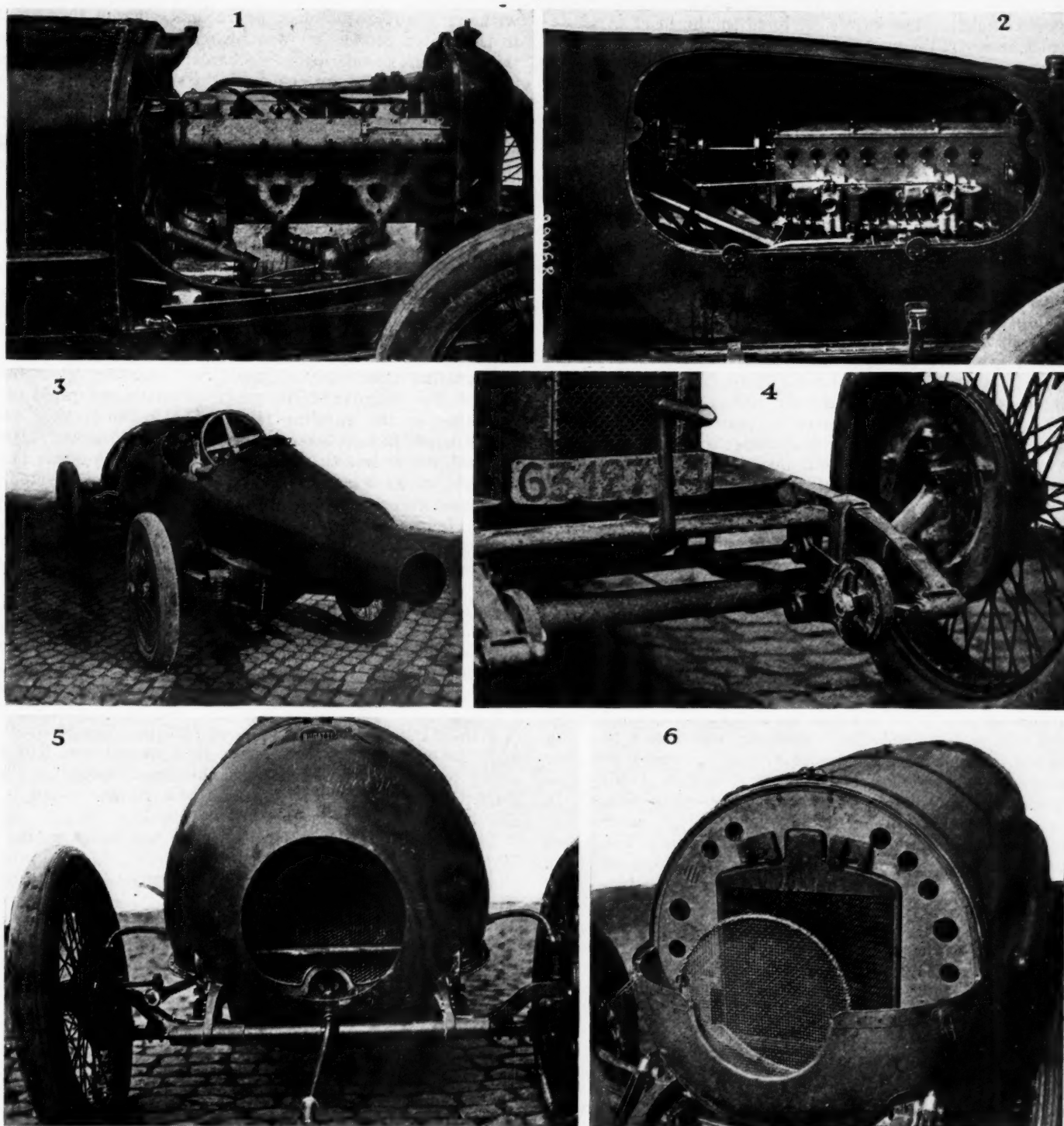


Side view of the two-litre Fiat, showing how the underpan conforms to the streamline form



Two views of the winning Fiat which was characterized by excellent streamlining resulting from the work of the Fiat aviation department. Even the side members of the frame were swept in at the rear. Note the unusual cross member to which the rear end of the rear spring is attached





1—Winning six-cylinder Fiat engine, showing double "Y" manifold with single carbureter. 2—Bugatti eight-in-line engine, showing magneto drive from rear end of overhead camshaft. Magnetos are mounted on the dash. 3—Tail of Bugatti, showing opening for exhaust gases. Note also the stream lining, and the peculiar cantilever rear spring. 4—Front end of winning Fiat, showing tubular axle, through which the springs pass, and front wheel brakes. 5—Front of the Bugatti, showing peculiar front cowling, axle construction and front wheel brakes. 6—Front of Bugatti with part of radiator cowl removed

the clutch. When the main fuel supply failed Bordino switched over to the reserve, and while he was filling up at the pits the mechanic reconnected the main gas line to the carbureter. This incident only lost him two minutes.

Biagio Nazzaro endeavored to stop a leak in the fuel tank but not being successful he pulled up on the following lap, lifted out his gasoline tank in two minutes and got away in 14 min. 25 sec. after having fitted a new tank and made gasoline and air line connections. This was only possible by the car having been designed to meet such an emergency.

Aston-Martin, an English firm, entered two four cylinder cars of only 1500 cc. (91 cubic inches) which, despite their handicap, made a good display until half distance, when one of them was abandoned with a burned out magneto armature and the other broke the magneto drive.

Technical interest naturally centers around the Fiats, designed by Engineers Fornaca and Cappa, because they proved themselves superior to all the others. Fiat was the only competitor to use steel cylinder construction, with sheet steel water jackets around each group of three, and the two groups placed very close together on an aluminum

base chamber. The valves, inclined in the head at 42 degrees, measured 39 mm. in diameter and each one had three concentric springs. A vertical shaft and bevel gearing at the rear drove the two overhead camshafts and a very light follower was used between the cam and the valve stem. There was a roller bearing between each pair of cams.

ONE of the features of this car was the very successful use of a type of roller bearing designed and produced in the Fiat shops. For the crankshaft, which was in one forging with balanced throws, there were eight roller bearings. The rods were H-section with split ends and two bolts, also with roller bearings. The wrist pin worked direct in the domed head aluminum alloy piston, which had two rings. A single Scintilla magneto was used and fired K.L.G. plugs placed centrally in the head. This magneto was of the fixed type but with an ingenious system by which the timing could be varied. Originally it had been intended to use two carbureters, one for each group of three cylinders, but in the race a single Fiat carbureter was employed, with an unusual type of cast aluminum intake manifold of small section forming a double "Y."

Unit construction of engine and gearbox with direct attachment to the frame members and center control for the four speed gearbox were employed. For the first time in racing Fiat used an enclosed propeller shaft. Drive was thus transmitted through the spherical head, just back of the gearbox.

An unusual type of tubular front axle was used. It consisted of two forgings fitting one into the other, pinned together and slotted to overcome any tendency for one-half to turn in relation to the other. The short semi-elliptic springs went through the axle itself, and the lower arm of the Hartford shock absorber was bolted to a lug forged on the axle. The upper arm of the shock absorber was attached to a yoke on the oval section front cross frame member, instead of to the side frame members. In addition to this, rubber bands were placed around the axle and the frame, just ahead of the axle. The front wheel brakes were operated by toggles instead of cams. A short lever on the top of the steering head had its inner end attached to the toggles operating the brake shoes, and the end outside the drum attached by a ball and socket to a rod going through the king bolt. A chain on the lower end of this rod passed around a small sprocket underneath the steering knuckle, and connection was made from the lower end of this chain to a bell crank on the axle by a rod

with wing nut adjustment on its end. From this crank to the pedal, connection was by means of steel cables to the servo brake operating mechanism, these cables going through the underpan, passing through copper tubes to prevent chafing.

All the competitors had paid very close attention to streamlining, but the Fiats were the most pleasing in this respect. This feature of design and construction had been turned over to the Fiat aviation department, which produced a body of exceptional lightness and perfect lines. To get the best shape, the main frame members gradually swept in from the center to the rear, so as to follow the outline of the tail. The mechanic's seat was staggered about 8 in., and the space back of the driver's seat was used for the mechanic to obtain a grip. The fire extinguisher and a thermos bottle were carried in this compartment, so that the mechanic had his hand on the extinguisher practically all the time. Another good feature of the design was the provision made for rapid dismounting of the gasoline tank. The value of this was shown when Biagio Nazzaro broke connections and lifted the tank out in less than two minutes. All the under portion of the car was as carefully streamlined as the upper part, the axle and shock absorbers being inside the pan. At the front the steering drop arm was inside.

Bugatti had a big circular cowl around the radiator, with a large hole for the passage of the air. A long circular section tapering tail, having the exhaust going through it, was employed. Ballot had a somewhat similar general arrangement in front, with a much narrower pointed tail and external exhaust pipe. The Fiat arrangement of riveting the exhaust collector to the body, thus making use of it to stiffen this latter, was very good.

MINIMUM weight was fixed at 1433 lb. The 91 cu. in. Aston Martins were below this weight and had to carry ballast. The Fiats had the exact weight. The Bugattis averaged 1630 lb., and the Ballots were the heaviest, for Masetti's car scaled 1850 lb.

Tires gave wonderful service, there not being a single blowout and only one or two punctures. The winning Fiat changed two rear tires as a precaution; but the other Fiats did not make a tire change. Pirelli straight side cord tires, 30 x 3½ front and 31 x 4 rear, were used in these cars. Sunbeams used the new Dunlop straight side cord tire. Ballot and Rolland-Pilain had Michelin clincher bead tires. For the first time in a European road race all the competitors went away without a spare wheel.

## Cars in the Fuel Consumption Race

THE Peugeot cars in the so-called "fuel consumption" Grand Prix, were fitted with a new type sleeve valve engine which will be put on the market next year.

Empty, the cars were required to weigh 3086 lb.; with the driver, ballast representing three passengers, nearly 32 gal. of gasoline and oil, two spare wheels, spare tubes and tools, they scaled at least 4400 lb. when ready for the race.

There were no tire troubles in this race, either on the Michelin equipped Voisins or on the Peugeots with Dunlop straight sides. Because no outside assistance of any kind could be given, the drivers carried three spares, but experience showed that a single spare wheel would have been a sufficient precaution.

In the case of the Voisins a modified sporting type chassis was used, with a sleeve valve engine of 95 by 130 mm. bore and stroke. The compression was con-

siderably increased and dry sump lubrication with air circulation through the base chamber was made use of. Ignition was by both Scintilla magneto and battery, with a special type of plug known as the Jam, having water circulating through it. A Solex carbureter was used on the winning cars.

A SELF-CONTAINED horizontal press for general work has been placed on the market by the Oil-gear Company. It has a capacity of 25 tons at pressing speeds of from one-quarter to six in. p.m. The maximum ram speed in the direction of the work is 37 in. p.m. and the maximum return speed 56 in. p.m. The ram speed can be changed instantly by means of a small handle controlling the variable stroke pump. A constant speed two hp. electric motor drives the pump.



# Needless Numbers Are a Nuisance

Factory service costs can be reduced by elimination of useless numbers in shipping and receiving materials. Fifty cents' worth of bolts often have ten numbers attached to them. "System" is often carried too far and is no substitute for clerical intelligence.

By Dwight Davis\*

**T**O-DAY there came to my desk a typical Shipping Advice; it had the usual serial number, say, 25789, and meant that one of our customers had ordered and received some bolts that were not exactly what he wanted so he was returning them for exchange.

This Shipping Advice carried the usual data as to routing, date of shipment, etc., and also afforded the rather elaborate and interesting information that:—

1. Shipment was covered by Bill of Lading No. 1220.
2. The bolts had been purchased on Purchase Order No. 41144, Req. No. 6754.
3. We had shipped them on our Shipping Order No. 2387, Bill of Lading No. 9834.
4. The customer had received them on his Receiving Report No. 9678.
5. His inspectors had found them incorrect and so reported on Inspection Report No. 2121.
6. The customer's Accounting Department was sending us Debit Memo No. 11556.
7. He would immediately send us a new Purchase Order No. 46876, Req. No. 8890 to secure the bolts he really did want.

These bolts, by the way, are worth about half a dollar.

Exaggerated? Not a bit—it is only a typical example of the frequent use of a procession of "needless numbers" to record the simplest sort of transaction.

There's something radically wrong, if "system" calls for so many clerical operations, transcriptions, and repetitions, to say nothing of the filing involved.

Of course, records are needed, always, and regardless of the values in question. Dozens of cases like this come up daily and various internal departments must be provided with their individual records of each transaction.

The same principles, however, that have so often reduced the special sizes and shapes in manufacturing can well be applied to office practice. Many steps can be eliminated; numerous "forms" can be discarded and the whole process simplified by using fewer papers but making each tell more nearly the whole "story."

The various forms in the case illustrated undoubtedly supply records of each step in the transaction. Considered

independently, each seems ideal for its purpose, but standing alone is hardly intelligible; it must be tied up to all the others to get the real truth or to understand just what the thing is all about.

Right here lies the grave danger of carrying so-called "system" too far; the danger of too great subdivision of clerical operations into so many apparently simple steps that only average intelligence is needed to handle any one of them.

It can only result in an office-full of mediocre clerks instead of potentially future executives. We are too often discouraged by the erroneous assumption that clerical

forces can only be recruited from a class of only average intelligence. We don't choose as carefully as we might, and then we supply the deficiency by means of a lot of inferior tools in the shape of "fool-proof" forms that "anybody can handle."

It is said that the late John H. Patterson, of the National Cash Register Co., believed he could at any time "fire" his general manager and hire a new office-boy, and things would go on as smoothly as ever.

He meant, in other words, that each employee had been

selected with a view to some day filling the job just above him.

This method is the only sure way to build up a really efficient personnel. Each new employee should then be trained in the atmosphere of the basic principles of orderly, logical office operations and learn the real purpose of the whole organization as fast as he is capable. If need be, he should be dismissed the moment it is found there is only one thing he can do; for many a system or process has been founded on the limitations of the clerk, apparently with the idea that if he can only understand a little, we must devise some simple little job for him to do and then some other little step for each other little clerk. Thus many simple jobs of filing or recording or indexing are countenanced and continued just because "it is convenient and doesn't cost much?"

These operations multiply rapidly, and two distinct losses result: clerical operations and records are often duplicated, and, transactions which could be readily handled by extra

**T**HIS article tells how to simply work and save money. It is written from practical experience and applies definitely to nearly every factory in the automotive industry.

\* \* \*

The writer not only shows how many needless numbers confuse clerical practice and add to overhead expense, but also presents a constructive plan for solving the difficulties. Every executive interested in the handling of parts will want to read this interesting discussion.

\*Assistant Service Manager, Timken-Detroit Axle Co.

copies of a single carefully designed "form" telling a clearer story are needlessly complicated by a multiplicity of separate papers meaning practically nothing in themselves.

This is the principle which this article purposes to outline. The observations and suggestions which follow are the result of an experience of several years in the service departments of the Timken organization and others. Probably a service department affords a broader opportunity to study the varied processes of a great many concerns, because service operations cover both incoming as well as outgoing movements of materials, so to speak.

In our own case the problem has to do with the recording and shipping of orders for a largely assorted stock of automotive parts to hundreds of different customers. After several years in the business we felt we had built up a rather ingenious system. As is usual, we thought the first thing to do with an order was to translate it into our own language; to give it our own serial number and then request our customer "to use *our* number in future correspondence, etc."

We filed the customers' orders in one place, our correspondence in another, and of course we had to have another file for the papers to which we had transcribed the orders. Naturally such a plan called for the usual schemes of cross-indexing, registering, transcribing, etc.

Anyone at all familiar with every-day office practice will recognize the picture, without our going into detail here. With local variations it is the same general plan in use everywhere.

#### A Natural Filing Method

**N**OW compare it with the following brief outline of a much more natural, simpler, easily understood method based on the principle that the customer's "reference" or his "order" or his "number" is likely to be the key to every inquiry that may be made about a specific transaction, in the future; in other words, let's adopt the customer's method as far as we can—not only because he is our customer and so entitled to whatever courtesy we can extend—but because it is really the most commonsense plan after all.

File the order, attaching thereto all letters, memos, stock-room orders, shipping documents, etc. Use the customer's number as the only numerical reference to be considered. Each one will of course have his alphabetical division in the file and his orders will naturally fall into more or less chronological sequence as his numbers run along. Incidentally, if he happens not to have given a formally numbered order for some item whose shipment is requested simply by letter perhaps, the date of such letter, particularly if written thus:—"1003" (meaning Oct. 3rd), or perhaps "924" (meaning Sept. 24th), will furnish just as convenient a filing key as any other.

In the Claims Division of our Service Dept. an unusual opportunity has been afforded to study the methods of many different concerns. They stand high in the business world as models of so-called efficiency. Some of them maintain efficiency departments. Their clerical processes seem logical and necessary. The forms used are well designed for their specific purposes. Their various filing systems are standard and afford rapid reference—but most of them appear to be founded on the theory that not only the clerks who handle each file, but even those outside the immediate organization understand the system followed, as well as though specially trained therein. This statement needs no further proof than the experience we so often have when writing to another concern about one of *our* orders and being requested to quote *his* "reference number" before our inquiry can be understood.

In other words the average system is not only intricate

for those who sponsor it but even more so to those it ought really to serve.

In the bolt incident responsible for this discussion, every document in the whole chain might just as well carry the same serial number, provided each paper is properly dated. As a matter of fact the date itself is merely a "number" in a different guise.

Granting without argument that each recording operation relating to those famous bolts is necessary, in some form or other, let us first consider the possible danger of confusing one "form" with another. In the first place, the title of the average form usually automatically describes its function. In correspondence, in oral reference to it, in all cases we always refer to it as "Purchase Order No. 1333" or "Credit Memo No. 1333" or "Bill of Lading No. 1333" as the case may be. The title and the matter written on it clearly identify it. There's no possible chance of confusing it with any other form. The serial number in itself tells nothing; it only suggests an indexing process, or a cross reference, or a method of filing.

If, through habit—there is no other logical reason—we *must* use a serial number, let us by all means adopt a system of numbers that not only mean something but which can be automatically originated by the writer of each document and be at once understood by each reader thereof.

In our modern civilization there are two devices we use daily, in fact almost hourly, and yet we somehow or other haven't seized the splendid opportunity to adapt them to the simplification of this endless maze of arbitrary serial numbers in which we are all involved. We have the calendar and the clock. If we look at the calendar and read "June 21," we may perhaps write it as "6/21"—we could just as well write it, "621." We glance at a watch and note that it is "half-past-ten;" we write it, "10:30" and yet we might just as well write it, "1030."

If it could be generally understood that every paper, every document, every order, even every letter we write carried the date as well as the "hour" and these "numbers" were written in the style just described, we should never more need an index or a register of any sort to record them.

This modified method of writing dates is mentioned here only as showing the possibilities of such a plan—such numbers however, with their inherent intelligibility might well add to the benefits to follow the general scheme of using only one number to identify each of the several forms in the bolt matter before mentioned.

#### Records Kept Chronologically

**T**O return to our illustration—A Purchase Order No. 621 is issued for 150 Automobile Axles of a certain design, the order being dated, say June 21. On June 24, 70 axles are received, and recorded on "Receiving Report No. 621," dated June 24. Thirty of these axles are not exactly according to specifications, so they are to be returned and "Shipping Order No. 621," dated June 24, is issued to accomplish it. Right here a very natural question arises—suppose more than one lot is received the same day perhaps. Isn't there some danger of confusing one lot with the other? Not if each document in the case tells its full story. The trouble with the average form in present day practice is that it is too abbreviated; too much dependence is placed on the distinctive character of the form itself rather than to make the very simple and common sense effort to fill in one or two minor items of information that would tell the story just a bit more clearly.

Incidentally, if the "time" were shown on each one of the papers used there could never exist any confusion as to the specific lot in question.

Now let us go a bit farther—When the 30 rejected axles are returned to the maker, a Debit Memo No. 621, dated



June 24th may be issued by the buyer. A little later 30 axles to replace those returned will be delivered by the maker. They will be applied against the same order No. 621 and reported again on a Receiving Report No. 621, though the record in this instance will be dated perhaps June 27th.

This process can go on indefinitely. The idea that each separate step in the transaction must be dignified with its own special serial number is not only unnecessary but well-nigh ridiculous. If each paper tells its story clearly, how much better the plan than to wade into the typical chain of needless numbers. In the proposed plan each step is clear to anyone who reads; in the usual system no one can understand a single paper without referring to all the others.

**F**OR instance, if an inspector rejects an article he knows it will be returned to the supplier. There is therefore no real reason why he shouldn't then and there write the Shipping Order himself without delay. Certainly his reasons for the rejection are of interest to nearly everybody who comes into contact with those articles.

Were it not for our unfortunate loyalty to habit—nothing else, for we've lived so long with the idea that each form must be made in just a certain way and that it would be treason almost to break into the sequence of serial numbers—we might in the case just described, make at one operation, a Shipping Order, a Packing Slip, a Debit Memo, a record for the Purchasing Department, and also a copy for the Receiving Department, which will necessarily be on the lookout for the new axles in replacement of those rejected. The trouble is, we have become so accustomed to having our printers assign numbers to the forms we use that we simply can't imagine assigning simple, intelligible, logical numbers to them ourselves. We have already told how in our own business we adopt the customer's number as our filing reference in the filing of his order. Were every customer using the standard system of numbering his orders by the "calendar and clock" method, what a simple, clear, interesting thing every order would be.

Right here it should be stated that there can be no possibility of numbering two orders the same, simply because it is practically a physical impossibility for a typist or in fact anybody to write more than one order in a given minute. Thus if it is at all possible that more than one order might be issued to the same concern in a day, the first one would simply be numbered 621-801 and the next one, 621-802—meaning that they were both issued June 21st, but at one minute and at two minutes after 8 o'clock respectively, and even if more than one typist be engaged in writing orders the chance of both writing identical orders on the same supplier at the same moment is negligible. Neither is there any difficulty about filing, because each suppliers' orders are filed under his name only.

Another plan for reducing "needless numbers" in connection with the issue of "manufacturing orders," or Shop Orders as they are usually called, is under way in our own plant. We follow the usual practice of designating various parts of our product by "part numbers." From time to time we issue orders to make certain quantities of this or that to replenish our stock. It was formerly the custom to issue these orders under arbitrary serial numbers. Each called for a definite quantity. Naturally at times the shop might be working on more than one order at a time

for identically the same part. This meant keeping records of the progress of each order, and the question as to the status of each order was apparently given more attention than the more vitally important question of "how many are there on order and how soon will they be completed."

For practical purposes it makes no difference how each particular order stands nor is it really necessary from a cost keeping standpoint, because in the final analysis the cost of any article is best determined by the total of labor, material, and overhead chargeable to it up to the end of a definite period.

We therefore use our "part number" as the serial number of the Shop Order, and simply date the order, which of course would be done in any system. Thus when we need 500 pieces of part "T6834" we issue "Shop Order No. T6834" for 500 and begin charging labor, material, and overhead to that number. So far we have had no trouble about segregating separate "lots," for if they do appear for any reason on the same date we simply show the clock hour on the document which may be the cause of possible confusion and the thing is solved.

The lengths to which such a numbering plan can be carried are without limit. It will work anywhere the "serial habit" exists.

Returning once more to the "multi-numbered" bolt problem it is obvious that after the original Purchase Order No. 41144 was issued, it should never have been necessary to issue another order No. 46876 at all in order to procure the entire quantity contemplated by No. 41144. Furthermore, if these same bolts were secured from several different sources of supply there is no logical reason why the same purchase order number should not be issued to each

supplier. It could cause no confusion in the Purchasing Department, because each separate order would file in the name of the separate supplier; in the Receiving Department the goods would arrive identified by the documents of the respective suppliers.

In reality, the purchasing department records would be simplified, for, it would require the simplest sort of a "single entry" record in which the debits would consist of quantities ordered from time to time and the quantities rejected and returned to the supplier, while the credits would be the gross receipts. The balance would always represent the amount due on the order.

**T**HE prevailing plan of issuing new orders to make up unfilled balances can only result in additional needless clerical processes and confusion. After all, the principal question in the procurement of material is not the condition of an individual order but rather the consideration of the total to be delivered, regardless of the particular scrap of paper on which the specific delivery be made. The attempt to separately identify purchase orders as is the usual practice is a good deal like expecting a bank to tag each separate dollar that one deposits. Certainly when we go to the bank to withdraw them we don't expect to receive the identical pieces of money we gave the teller.

It must be understood of course that the plan to number a shop order or a purchase order with the "number" of the article in question can be applied to *all* orders, for naturally many orders cover several entirely different kinds of material; in such cases the proper plan is to use the "calendar and clock" method.

**T**HE attempt to separately identify purchase orders, as is the usual practice, is a good deal like expecting a bank to tag each separate dollar that one deposits.

Certainly when we go to a bank to withdraw these dollars, we do not expect to receive the identical pieces of money which we gave the teller.

Probably one of the most interesting results of the scheme is that the date and the hour very often help one to instantly recall some incident or circumstance that relates to the issue of the paper in the first place; the mere mention of the number has a significance, and tells a real and sometimes complete story that a lifeless, arbitrary serial number never could.

Without any idea of usurping the duties or the authority of a Purchasing Agent, it happens that in most concerns several different persons may really initiate purchases. If order forms in general were unnumbered, there could be no good reason why pads of such orders could not be given to such authorized persons who could fill in the description of thing wanted, even in some cases giving the name of the supplier, and send such orders to the Purchasing Agent for approval and formal signature, without going through the needless process of writing the typical requisition. The usual order-form contains all the data as to routing, terms, packing, marking, etc., anyway, which conditions apply to all purchases, and in reality are nothing more than "letters" with certain portions printed instead of type-written.

The reasons for most systems of "needless numbers" are not hard to find. Some are the attempts to set up so-called "foolproof" methods. Others are the outgrowth of perhaps a sudden momentary demand for certain statistics the "manager" wanted one day—and has never wanted again—but the compilation has gone on just the same to anticipate a possible future request. Still others are the result of the natural growth of a business, calling for the sub-

division of records or operations or departments, it being necessary to add help to do the job or to assign certain work to specialists.

Many systems grew up in the abnormal period of the war. The emergency was often met by the addition of untrained clerks in positions where the greatest speed could be gained by dividing processes into simpler operations within the mental range of the clerk. He simply became a machine to turn out so many bills or so many orders without any knowledge of, or sympathy with, the other steps in the general process.

As business and industry return to normal, as simplification in mechanical processes are necessary to the very existence of the whole structure, so must we return to a firmer foundation in office detail, not only to conserve our mental and our physical faculties but to retain a true picture of the thing we are really trying to accomplish and to gradually build up a personnel in office organization that will give us a generation of really competent people who are able to vision the forest rather than the lone tree.

In its final analysis a "form" is no more nor less than a letter in print. It is designed only for convenience or to save a certain amount of handwriting. The tendency seems to be however to make of it a thing of mystery, sometimes an impersonal thing, complicated and hard to read.

Let's make them a bit more human—give them a bit more life, more romance if you like—instead of creating a parchment of hieroglyphics that mean as little to the average reader as the mysterious carvings on the tombs of Egyptian kings.

## Synthetic Woods for Industrial Purposes

OUR Berlin correspondent reports that Carl Leyst, a textile expert and chemist, has succeeded in developing a process for producing what he calls synthetic woods, from such materials as straw, alfalfa, esparto grass, rice straw, corn stalks, banana leaves and bamboo. He claims that these synthetic woods are capable of replacing such natural hardwoods as mahogany, beech, birch, lime and walnut. Efforts made heretofore in producing strong and resistant substances from the materials named necessitated bleaching of the raw materials, which rendered the processes too expensive, and, besides, the strength and homogeneity of the products left much to be desired. No bleaching of the materials is required with the Leyst process, and the finished product can be given any color from a bright yellow to a deep black, so that after polishing it has the appearance of genuine wood.

The synthetic woods produced in this manner are claimed to equal natural woods in most of their properties and to excel them in some; and, what is of great importance, they can be produced at lower cost than natural wood. The process seems to hold out special promise to countries in which no hard wood is grown.

Our correspondent was shown samples of synthetic wood made of unbleached straw, of which one side was polished, another showed saw tooth marks, another file marks and a fourth a ruptured section which clearly showed the wood structure. Smooth drill holes were also shown. After preliminary tests on this new material a statement was issued to the effect that this straw wood can be sawn, drilled, filed, planed and polished like good walnut wood, that it burns 30 per cent less rapidly than natural wood and can be made absolutely fireproof by a special process invented by Leyst. It can be glued like natural wood, can be molded, is heavier than water, has a specific electrical resistance of 300,000 ohms and is very little affected by atmospheric changes.

What renders the cost of production comparatively low is the fact that the expensive bleaching process is eliminated. It appears that the industrial application of the material is still in its very first stages, but if the claims as to qualities and cost of production can be substantiated there is no doubt that it will have a wide field.

In connection with automobile bodies it is suggested that these could be molded either in a single piece or in two or three large pieces that could be suitably fastened together. Such a body, it is claimed, could be given a color surface layer  $\frac{1}{4}$  in. deep, as bright and lustrous as the ordinary varnished surface but far harder. For closed bodies the new material is believed to be particularly suitable, partly because it has strong noise-insulating (non-sonorous) properties. Other suggestions for the use of the new material are in molded road wheels, battery boxes, combined cowls and instrument boards, etc. A large established firm in Germany is said to have taken up the manufacture of the wood.

A GASOLINE motor railroad car of improved design has just been completed by the P. A. Thomas Car Works, High Point, N. C., for the Winther Motors, Inc., manufacturers of motor trucks at Kenosha, Wis., who built the chassis equipped with a four-cylinder 60-hp. motor of the Wisconsin Motor Co., Milwaukee, Wis.

This car was given a try-out on the Carolina & Yadkin River Railway between High Point and Thomasville, N. C., the results of which were declared to be wholly satisfactory. The car weighs six tons, carries sixteen passengers and has a baggage compartment. It will pull a trailer with a carrying capacity of about 40 passengers. Its maximum speed is 35 miles an hour and it is designed to take the place of small trains on branch lines, being more economical to operate and also more convenient.



# New Departure Produces New Type of Bearing

Is intended especially for use in front wheels and designed to take both radial and thrust loads. Resembles cup and cone type, but has substantial races which resist distortion under heavy pressure.

**T**HE demand for ball bearings of a type specially for installation in front wheels recently led the New Departure Mfg. Co. to make an extensive study of the conditions governing the design of this type of bearing. It was concluded that there are several reasons which necessitate a bearing of special design for the front wheels.

In turning corners the heavy side reaction, due to centrifugal force is taken between short bearing centers, inducing heavy radial loads, which are said to require specially proportioned raceways to prevent deformation. This, combined with a considerable thrust load, was concluded to make it advisable to employ a different contact angle from that usually found in the standard type of bearing. A new design of bearing has therefore been developed to overcome these objections and produce an installation which will, it is thought, give maximum mileage with no need of mechanical attention beyond the initial installation. A cut of this bearing is shown in Fig. 1.

The five points which governed the main dimensions of the bearing were found to be as follows:

1. The safe fiber stress in the spindle determines the size of the bore of the inner races of the bearings.
2. The overall length of the hub must not be so great as to project beyond the fender line. This determines the position of the outer bearing.
3. The distance from the axis of the king pin to the point of contact of the front wheel tire with the ground must be as short as possible so as to provide ease of steering. The fulfillment of this condition determines location of inner bearing.
4. The bearings themselves must be so proportioned as to safely carry any load which may be borne by the spindle and must be provided with relatively heavy outer race sections so as to carry road shocks with a minimum of circular deformation.

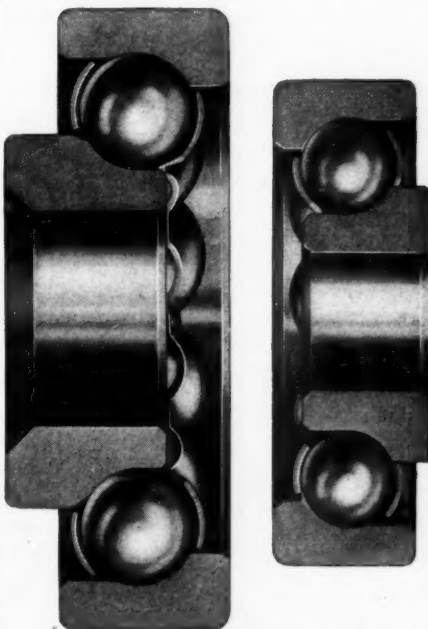


Fig. 1—The new type of New Departure bearing for front wheel applications

5. The bearings must be so designed that the wheel may be most readily mounted on or demounted from the spindle and at the same time admit of the most efficient dirt closures at the inner end of the hub.

Having determined these factors, a study was made of car weights in order to determine the maximum loads on front wheels, consideration also being given to the diameter of the wheels used. The information collected indicated that a division of the cars into six weight classes was desirable.

Fig. 2 shows the manner of installing the new type of bearings in a front wheel hub. The cone or inner race is so formed as to allow the felt dust washer to run on its surface, this surface being ground in order that there will be no danger of the felt being torn and rapidly worn out, as it might if a rough machined surface was left at this point. Experience has shown that the diameter at the contact points between the rotating felt washer and the stationary member should be as small as possible in order to reduce the velocity and consequent wear.

The tongued washer under the castellated nut should be about one-eighth of an inch smaller than the outer diameter of the cup or outer race, so that in the event of ball breakage there will be no danger of the hub slipping off the spindle.

The maximum weight for a given wheel size on the front wheels of the cars is as follows:

Hub No. 1—	30 in. wheel—	1100 lb.
Hub No. 3—	32 in. wheel—	1300 lbs.
Hub No. 5—	32 in. wheel—	1500 lb.
Hub No. 7—	34 in. wheel—	1750 lb.
Hub No. 9—	34 in. wheel—	2000 lb.
Hub No. 11—	35 in. wheel—	2500 lb.

The statement has often been made that a ball bearing is not suitable for frequently applied shock loads. In order to test this out, the machine shown in Fig. 3 was built. It consisted primarily of a vertical revolving shaft supporting two pivoted members at the extreme end of which were cast iron weights. These weights were mounted on two semi-elliptic springs and standard front wheel hubs were

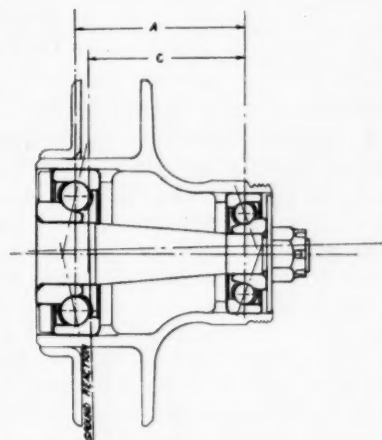
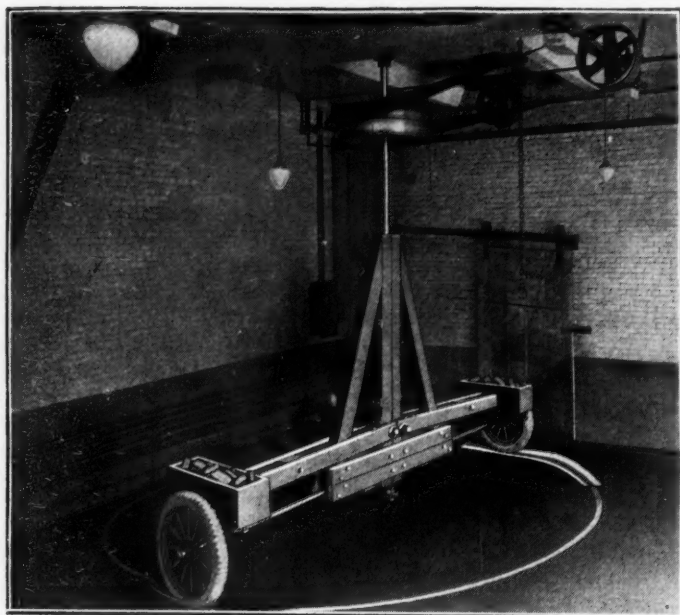


Fig. 2—Method of mounting bearing on front wheel spindle



mounted on the axles. The inner end of the axles were supported in cast iron collars at a distance from the springs equal to the spring centers of the average car, the weight on the springs being greater than that for which the bearings were recommended. This machine ran at a speed of 20 miles per hour around a circle whose diameter was 15 ft., there being two obstructions on the track. One had a rise of  $3\frac{1}{2}$  in. and formed an angle of 20 deg. The object of this obstruction was not only to impose a shock load, but also to create a thrust load on the bearings similar to that obtained when turning the average corner of 140 ft. radius at 25 m.p.h. The other obstruction allowed the wheel to drop 2 in.

This machine is reported to have run continuously day and night for thousands of miles with absolutely no failure of the bearings. There was, however, continued spring breakage and, on the average, tires were worn down to the fabric at the end of 19,000 miles.

Fig. 3—Device used for testing the new bearing under heavy load. The track is formed to impose shock as well as thrust loads

## A Resilient Motor Truck Wheel

*Springs in Hub Permit of Eccentric Motion of Wood Disk—Can Be Adjusted to Accommodate Various Loads*

THE operating speed of motor trucks has been increasing in recent years but is limited by the shock-absorbing or cushioning qualities of the tire and spring equipment carried. Some manufacturers of medium-size trucks, from 1 to 3 tons, have gone to pneumatic tires, but the majority of these trucks continue to be fitted with solid tires with comparatively little resiliency. The need for better cushioning of trucks is indicated, on the one hand, by the introduction of pneumatic tires of the giant type, as already mentioned, and on the other by the recent development of a type of tire intermediate between pneumatics and solids, known as semi-pneumatics.

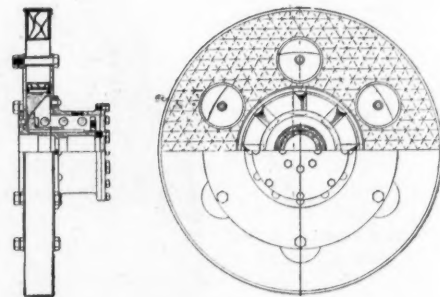
Some engineers see the solution of the high-speed trucking problem in some form of resilient wheel which will partly absorb road shocks before they reach the axle. Many forms of resilient wheel have been brought out, and they have been divided into three general classes, according to whether the resilient element is located in the hub, the spokes or the rim. The wheels might also be divided into classes according to the kind of resilient member used, steel springs, rubber cushions or pneumatic cushions.

A wheel with a steel spring in the hub is manufactured by the J. F. Davis & Sons Co. and is known as the Stopshock wheel. It is essentially a wood disk wheel, the wooden disk being provided with sheet steel armoring and mounted slidingly between two steel disks or flanges carried by the hub. Centrally within the wooden disk there is a steel cone, which co-acts with another metallic cone adapted to slide on splines on the inner member of the wheel hub. Within the hollow hub there is a coiled spring which forces the two cones together and causes the wheel to assume a position concentric with the hub or axle when there is no appreciable load on the wheel. The two flanges guiding the wooden disk are braced or steadied by bolts and spacer tubes extending through holes in the disk. When the wheel receives a shock, it will assume a position eccentric to the hub, and in so doing will compress the coiled spring. As soon as the shock has been absorbed the spring will force the wheel back into the concentric posi-

tion again. A cushioning range of from 1 to  $1\frac{1}{4}$  in. is obtained in this way.

At the outer end of the hub the spring bears against a plate which can be adjusted laterally by means of four studs, and thus the cushioning action of the wheel or hub varied. For instance, if a long trip were to be made under full load the spring could be adjusted to give its full range of deflection under shock with full load, whereas for similar trips without load the spring would be relieved of some of its pressure. For ordinary short trip hauls it would, of course, be hardly practical to adjust the springs to the load, although all four wheels can be adjusted in about 20 minutes' time. The action of the resilient hub can be

Sectioned views of Stopshock wheel



nicely demonstrated by mounting a scribe on the hub flange and letting it scribe on a chalked surface of the disk. The scribe will clean a substantially circular space on the side of the disk of its chalk and the radius of this circle denotes the range of resilient action. The mechanism within the hub is lubricated with graphite.

Among the claims made for this wheel are that it permits of increasing the speed of trucks and that it saves the tires and economizes fuel. The smoother suspension makes the driving of the truck more pleasant, and it tends to preserve the goods transported. Side thrust seems to be well provided for, and driving shocks cushioned, yet the construction is simple.



# Lewis Constants Determined for Long Addendum Gears

Method of obtaining value of constants for full strength formula. Long addendum pinions with small number of teeth materially stronger than standard pinions, but gears are weaker. Consequently long addendum principle is of value only in large reduction sets.

By P. M. Heldt

ONE of the methods of obviating large undercut in pinions with a small number of teeth—which has a tendency to weaken the pinion—consists in dividing the working depth unevenly between the addendum and the dedendum, making the addendum of the pinion greater. The practice of making the addendum equal to seven-tenths of the total working depth has been followed especially in bevel gearing, and this type of gear is known as the long addendum gear. To mesh properly with the pinion, the gear teeth are made with an addendum equal

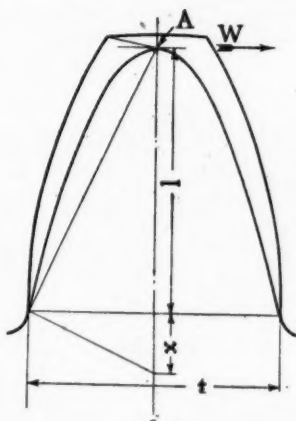


Fig. 1—Tooth outline of 18 tooth long addendum pinion

to seven-tenths. It appears that the values of the constant  $y$  in the Lewis formula for gear strength have never been worked out for this type of gear, and, therefore, although it is quite obvious that in the case of a pinion with a small number of teeth the long addendum tooth is stronger than the standard tooth, it has never been determined just how much stronger it is. These values, of course, are known for the standard form of tooth for pinions with any number of teeth, and equivalent values are also known for stub teeth.

The Lewis formula is based on the assumption that the whole load on the gear is taken on a single tooth, that it is equally distributed over the whole width of the tooth, but that under the most unfavorable conditions it comes at the extreme outer end of the tooth flank. The tooth pressure is normal to the flank, and, therefore, makes with the center plane of the tooth an angle referred to as the pressure angle which in this type of gearing is usually equal to  $14\frac{1}{2}$  deg., though 20 deg. long addendum gears also have been made. At the center of the tooth the pressure therefore takes effect at the point A (Fig. 1).

The tooth then acts as a cantilever beam, and use can be made of the rule that a cantilever beam loaded at the free end, in order to be subjected to uniform bending stress, if of uniform width, must be made of parabolic vertical section. Therefore, if we draw inside the tooth outline a parabola with its apex at A, its two branches tangent to the flanks of the tooth at points near the base, we get a parabolic, uniformly stressed beam of the same strength as the tooth. Then, designating the tangential load on the gear by  $W$  the distance from this point A to the line connecting the two points of tangency between the tooth outline and the parabola by  $l$ , the face width of the tooth by  $f$ , the thickness of the tooth at the points of tangency (evidently the weakest section) by  $t$ , and the working stress by  $S$ , we have

$$Wl = \frac{Sft^2}{6}$$

from which it follows that

$$W = \frac{Sft^2}{6l}$$

Now, by similar triangles,

$$X = \frac{t}{2} : \frac{t}{2} : l$$

and, therefore,

$$x = \frac{t^2}{4l}$$

Substituting in the equation for  $W$ ,

$$W = S f \frac{2x}{3}$$

or

$$W = S p f \frac{2x}{Bx}$$

and denoting  $2x/3$  by  $y$  we get

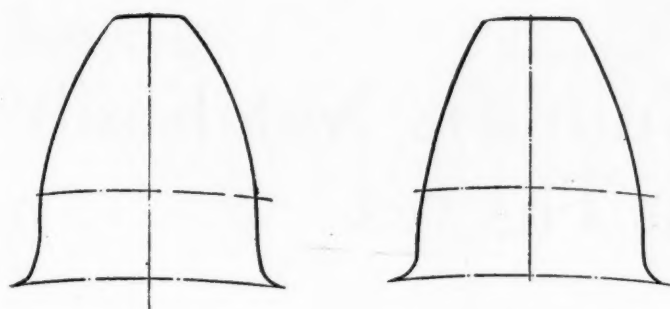
$$W = S p f y,$$

which is the Lewis formula. The above reasoning shows how the value of the constant  $y$  may be obtained from the outline of the pinion tooth.

The long addendum system is not a universal system and is intended only for sets with a comparatively large reduction ratio, such as is used in automobile rear axle drives. No definite lower limit for this ratio has ever been set. Since the gear has a greater dedendum than a standard gear, it is obvious that the gear or driven member is weaker than a standard gear of the same number of







12 tooth pinion

24 tooth pinion

Fig. 4—Tooth outlines of long addendum pinion

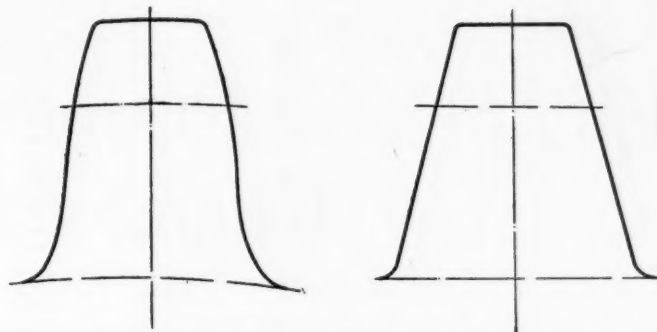


Fig. 5—Tooth outline of short addendum gear (48 teeth) and rack

given in the accompanying tables. It will be seen that within the limits covered by these tables, unless the gear ratio of at least 5, the teeth of the pinion will be stronger than those of the gear.

The benefits of the long addendum principle in certain cases is easily seen by comparing the Lewis constant for the same numbers of teeth for long addendum and standard teeth. Thus the value of  $y$  for a 12-tooth standard pinion is 0.067 and that for a 12-tooth long addendum pinion, 0.093. This shows a gain in strength of almost 40 per cent, but this gain is completely realized only if the long addendum pinion is used in combination with a gear of at least 68 teeth.

Values of factor  $y$  in Lewis formula for long addendum pinions with an addendum equal to seven-tenths the working depth.

No. of teeth	Value of $y$	No. of teeth	Value of $y$
8	0.085	14	0.096
9	0.088	15	0.097
10	0.090	16	0.098
11	0.0915	17	0.099
12	0.093	18	0.0995
13	0.0945	19	0.100
		20	0.101

Values of factor  $y$  for Lewis formula for short addendum gears with an addendum equal to three-tenths the working depth.

No. of teeth	Value of $y$	No. of teeth	Value of $y$
50	0.078	60	0.088
52	0.080	64	0.090
54	0.082	68	0.093
56	0.084	72	0.095
58	0.086	76	0.097

## Heat Treatment of 1 Per Cent Carbon Steel

**A**N investigation of the effect of different heat treatments on carbon steel with a carbon content of 1 per cent (spring steel) has been made by the Bureau of Standards.

The points that were investigated cover the effect of quenching in different media; the effect of various oil-quenching temperatures; time of heating prior to oil-quenching; the time at temperatures above  $A_{cm}$ ; the time at temperatures between  $A_{cl}$  and  $A_{cm}$ ; the effect of tempering steel hardened in different ways, and the effect of time in tempering at a temperature slightly below  $A_{cl}$ . The following conclusions are arrived at:

1. The most suitable oil or water quenching temperature for steel which is subsequently to be tempered at relatively high temperatures is slightly above the end of the  $A_c$  transformation.

2. With increase in oil quenching temperature for steel subsequently tempered at 538 C (100 F.) hardness, strength, and limit of proportionality increase and maximum values are obtained after quenching from 843 C (1550 F) which is coincident with retention of all but a small portion of the excess cementite. A higher quenching temperature results in decreased strength.

3. When this steel is subsequently to be tempered to produce tensile strength in the neighborhood of 120,000 lbs.-in., water quenching is to be preferred on account of a higher elastic ratio produced, always assuming that the size and shape of material is such as to allow drastic treatment. If higher strength is desired (which condition requires lower tempering); oil quenching from just above the  $A_c$  transformation will give slightly better

combinations of strength and ductility, but with lower elastic ratio than are obtained by water hardening.

4. A lower tempering temperature is required after water hardening than when cooling in oil from the same temperature in order to produce the same strength. This difference in temperature in general increases the higher the strength required (the lower tempering temperatures).

5. When samples are quenched in water and others quenched in oil and all so tempered as to produce the same strength, the water-quenched steel will have the highest hardness as determined by the Brinell and Shore methods.

6. While good combinations of tensile strength and ductility may be obtained by tempering at the higher tempering temperatures, the steel is brittle and has low resistance to impact. This is shown by the much higher combinations of strength and ductility obtained in tensile tests when the steel is ground to size after heat treatment and by the low Charpy and Izod values obtained in all cases.

7. Increased time at hardening temperatures results in increased hardness, strength, and limit of proportionality, and decreased ductility, as does rise in temperature.

8. Long-time heating just under the lower critical range results in a material softening of the steel, equivalent to a decrease of 40 per cent in Brinell hardness and 20 per cent in Shore hardness when the time at temperature is increased from 30 minutes to 5 hours. Short-time heating in this temperature range results in a softer steel than that air cooled from above the transformations.

# Engine and Frame Numbers Not Easily Changed by Thieves

Many suggestions as to numbering methods which can be readily applied during manufacture of engines and car frames are summarized in this report. Non-alterable numbers are sought.

**A**N interesting progress report covering the subject of numbering car frames and engines has resulted from several months' work by the Passenger Car and Engine Divisions of the Standards Committee of the Society of Automotive Engineers. The purpose of the work has been to devise a method of numbering which will make it impossible for thieves to alter or obliterate numbers placed on the frame and engine of a vehicle without rendering the change readily apparent even to a person who is inexpert in detecting such fraud. On the other hand, the method of applying the number in the first instance must not be so difficult as to render it impracticable in regular production work.

The history of the Society's endeavor to find a tamper-proof numbering system is briefly as follows: About two years ago the New York Police Department approached the National Automobile Chamber of Commerce with the request that the Chamber get up some system of numbering that could not easily be changed by thieves. The N.A.C.C. referred the problem to the S.A.E. and the latter referred it to the Standards Committee by which it was referred to the Passenger Car and Engine Divisions. Meanwhile the National Board of Insurance Underwriters had become interested in the problem and offered a reduction in the theft insurance rate of 7½ per cent on cars carrying engine numbers of a system that might be approved by them, 7½ per cent on cars carrying frame numbers of a system that might be approved, and 20 per cent on cars carrying both engine and frame numbers of an approved type.

## Raised Cast Numbers Not Satisfactory

**T**HE problem was taken up by the Passenger Car and Engine Divisions and a preliminary report was made at the last winter meeting. The work has been carried on in collaboration with the Underwriters Laboratories, and the plan of casting raised numbers on the crankcase has been definitely turned down by the Underwriters. Following is a summary of the plans proposed to date: Casting numbers on the crankcase (not applicable to frames); use of expanded disks; casting a special alloy in the crankcase; using a checker board system; casting a small, thin fin on which numbers could be stamped, on the crankcase, so that the numbering fin could be broken off by the dealer and held for the purchaser; welding raised number plates to the frame; armor plate number plates riveted on, using two or more rivets which enter into the frame construction; embossing fairly large numbers deeply into the frame; punching or drilling small holes in the frame at such a place that it will not be weakened; inseting the number under a glass cover in a spring bracket or other casting or forging in the frame assembly (also applicable

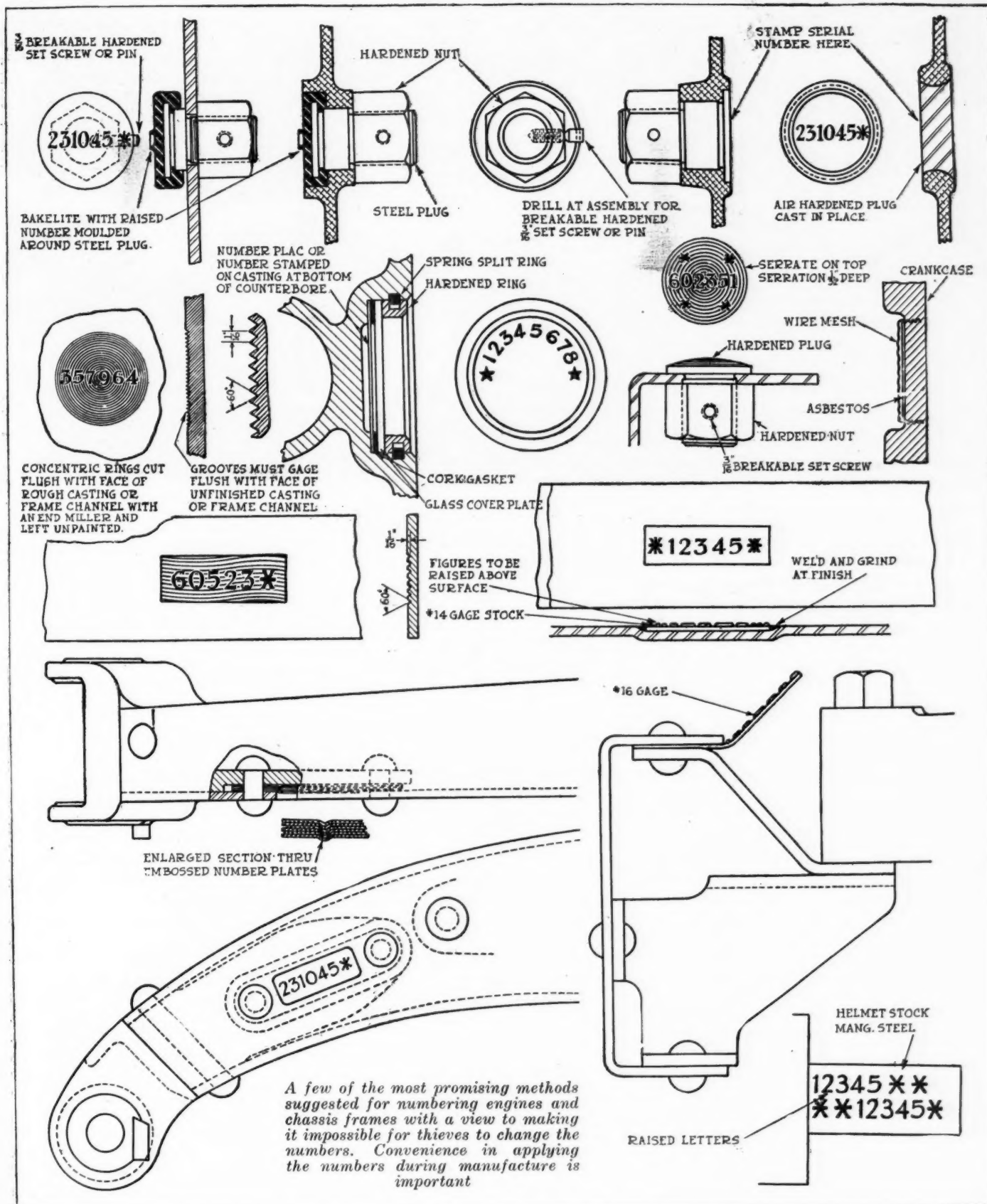
to engines); a thin plate with the number embossed on it held in a frame or riveted or blind-screwed to the car frame; an armored plate riveted down and a special seal of some sort placed over the rivets; case-hardened plugs or plates bearing the numbers fastened into the frame with blind screws or some similar device (also applicable to engine); a plate of Bakelite or some similar material over the numbers and fastened behind the channel as in the preceding plan (also applicable to engines); setting a series of nickel embossed plates somewhere in the frame or in the engine in such a way that they could not be removed without tearing down the engine or frame (the reason for the use of nickel being that it is not easily affected by the acetylene torch).

## Samples of Proposed Systems

**T**HE following suggestions have been actually embodied in the form of samples:

- 1.—A depression is cast in the front spring hanger and a series of thin nickel plates with perforated numbers is set in. The plates are held in position by the spring hanger rivets, the numbers showing through a slot cut in the web of the side rail. The nickel plates will not stand the heat of a torch. If necessary, these can be welded in.
- 2.—A heat-treated nickel steel plug with numbers stamped on circular serrations held in the frame side rail by a heat treated nut with set screw through it of which the head is broken off.
- 3.—Same as No. 2 except tool steel.
- 4.—Numbers and Bakelite cap molded on heat treated nickel steel plug which is held in side rail by heat treated nut with set screw through it with head broken off.
- 5.—Circular serrations put in side rail by frame manufacturer on which the car manufacturer would stamp the serial number.
- 6.—Line waves stamped in side rail by frame manufacturer on which the car manufacturer would stamp the serial number.
- 7.—Tool steel plug held in wall of crankcase with heat treated nut and set screw through it with head broken off.
- 8.—Same as No. 7 except nickel steel, heat treated.
- 9.—Numbers and Bakelite cap molded on heat treated plug which is held in crankcase with heat treated nut with set screw through it on which the head is broken off.
- 10.—Numbers stamped on crankcase wall and a glass placed over the numbers. The glass rests on a cork gasket, and is held by a snap ring of liberal size which locks in a groove cut in the case. A steel ring pressed in place conceals the snap ring.





11.—A heat treated tool steel plug cast in the crankcase. A chill is placed across the plug so the heat will not soften the plug.

12.—A sample has been made showing how plug is to be cut for casting in crankcase.

13.—Nickel numbers cast in aluminum crankcase, the numbers being high enough to go through the wall of

the crankcase and project about 1/8 in. on the outside.

14.—Same as No. 13 except through cast iron case.

A great many additional suggestions have come in recently and samples of the promising ones among them will be made up later. The ideas which have been embodied in samples are the ones which seemed the most practical among those received up to a short time ago.



*The proposed Bear Mountain-Hudson River bridge*

## A New Highway Link Between the East and West

**Bridging the Hudson at Peekskill to relieve traffic congestion in New York. A development of importance to the industry as a step toward offsetting an increasing cause of sales resistance.**

**H**IGHWAY congestion in and around our large cities is producing a condition which is already being felt in the form of increased resistance to the sale of automobiles. The urban automobile owner who is not able to be on the road during week days now hesitates to start out on Sunday and holiday runs, as he knows that it is going to take him hours of time and put him to great inconvenience to get into the country or to nearby towns. Conditions cannot be much worse before he decides that it does not pay him to own and operate a car.

That is one phase of the matter. A more important one fundamentally, perhaps, relates to the development of highway transportation. With highways already crowded in the leading commercial centers, this development is going to be slow if radical steps are not taken to relieve congestion. It is not enough to divert through traffic to less congested roads within congested areas. And there is a limit to the possibilities in this direction, especially when the topography of the country is such that large rivers must be crossed and the only means of crossing is by ferries.

Ferries were adequate years ago, but they have become obsolete in handling present highway traffic and it must be recognized by all who are interested in promoting the use of motor vehicles, and in facilitating the movement of traffic, that a severe limitation has appeared which

must be studied and conquered if the industry is to grow and expand in a normal way and commodities and persons transported most economically.

The traffic situation in New York City is representative of conditions in many other centers and an analysis of conditions there has a certain application to the question in general. New York City has the traffic of a big city with large outlying cities which feed to it, but coupled with it is the added disadvantage of being separated from large industrial centers, in fact from the entire western part of the United States by the Hudson River with no bridge south of Albany, 125 miles away. This, of necessity, throws all vehicle transportation between the two shores on the ferry system.

It is unnecessary to go into the troubles that this situation creates other than to say that it is not unusual at the height of week-end traffic for vehicles to wait from five to ten hours to get passage across. This entails extreme inconvenience to passengers not to mention the economic loss which occurs in the transportation of commodities by trucks.

The inadequate ferry service made worse by the fact that the ferries for the most part discontinue service at midnight or earlier has so tied up communications that private capital has undertaken to build a bridge and the Bear Mountain-Hudson River Bridge Co. has been organized to put the project through.



The structure will cost about \$5,000,000. It will accommodate vehicular and foot traffic and will be approximately 55 ft. wide. There will be one span 1650 ft. long. Towers will be 400 ft. high and the bridge proper will be 150 ft. above high water. The western approach will be at Bear Mountain, five miles below West Point, and the eastern approach three and one-half miles above Peekskill.

The charter provides that it be a toll bridge for 30 years, at the end of that time it is to be handed over to the State. The right is given to the State to purchase at any time before the 30 years are up.

While the bridge is located some 40-odd miles from New York City, it will have a decided effect in relieving congestion and facilitating traffic. In addition it will permit residents of New England to visit upper New York State and the summering regions of the Catskills. It will provide a way to go south from New England without going through New York City and vice versa. Short-haul motor traffic will be greatly aided and this is a very important factor near large cities. A glance at the accompanying map will indicate the range of possibilities.

As has been said, tolls will be collected. These are under the supervision of the Public Service Commission. Present plans call for a charge of \$1 for a touring car and 15 cents for each passenger; truck rates will be slightly higher according to tonnage capacity. Toll bridges and highways have always been considered more or less of a nuisance and their abolition has been sought, but it may be that we have come to a point where they are only a blessing in disguise.

Construction work takes capital. Funds from the public treasury are not always forthcoming and legislative action moves all too slowly. Part of this is due to lack of foresight in that the growing need for transportation facilities is not realized. The alternative would seem to be to attract private capital and the Bear Mountain-Hudson River Bridge is a good example.

Private capital naturally seeks a fair return on any investment and in fact must see the return before any construction work is attempted. In this particular it is interesting to note how the new bridge organization determined its possibilities.

To estimate the amount of traffic that would use the bridge and from that the necessary toll charge to pay for the investment and yield a yearly return, traffic census was used. Census was taken on important nearby highways, New York City bridges crossing the East River, New York City ferries and more especially the Hudson River ferries handling the traffic which will in large measure be diverted to the bridge when finished. The excellent census made by the Connecticut Highway Department in cooperation with the Bureau of Public Roads was also used.

#### Bear Mountain-Hudson River Bridge Traffic Estimate

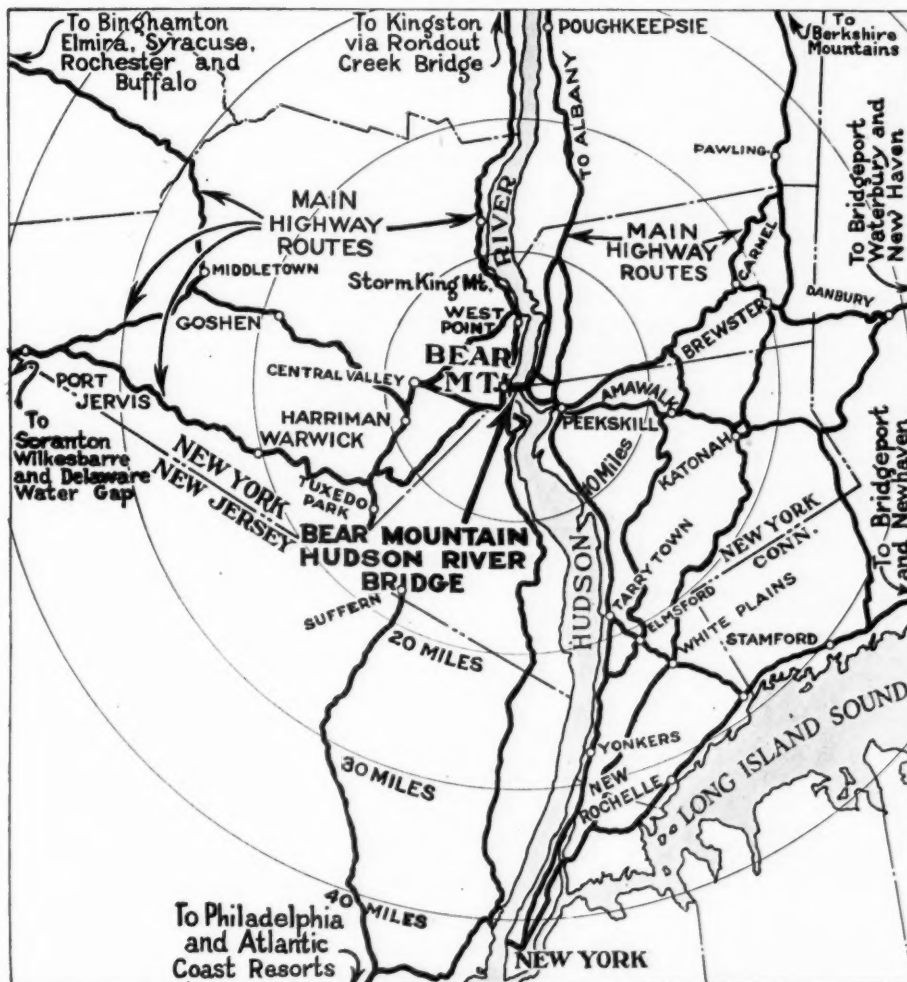
During June, July, August, September and October:

50 Saturdays, Sundays and Holidays at 3000 cars per day .....	150,000
103 week days at 1500 cars per day .....	154,500
During April, May, November and December:	
38 Saturdays, Sundays and Holidays at 2000 cars per day .....	76,000
84 week days at 1000 cars per day .....	84,000
During January, February and March:	
90 days at 400 cars per day .....	36,000
	<hr/> 500,500

The final estimate for the Hudson River bridge determined from the various data collected by the builders, Terry & Tench, totals half a million motor vehicles for the first year (1924) and allows a 2 per cent yearly increase. This estimate is thought to be conservative, in fact one state highway authority predicts a million motor vehicles for the first year. In view of the fact that the ferry traffic increased 20 per cent in the last year, the yearly increase seems moderate. For in 1954 the

traffic figure is estimated at 943,120. If the million mark should be reached the first year the conservativeness of the estimates and the value of the project will be unquestionably established.

To those who are interested in getting motor vehicles in the hands of operators and those who are interested in keeping them on the road once they are sold the problem of highway congestion has real significance. Sales resistance cannot easily be laid to this or that cause to a specific degree, but it is evident the resistance due to overcrowded roads is increasing and will continue to do so until the problem is effectually solved.



This map shows how the new bridge will relieve traffic congestion on important highways

# 10 Miles of New Road Sell 90 Cars in Alaska

National Forest Service survey shows definite relation between new roads and automobile sales. Eighty-six miles of road building will result in half-million dollar investment in cars in six small Alaskan towns. Double mileage trebles motor vehicle sales.

**R**OAD construction in the National Forests of Alaska during the last three years gives a striking concrete illustration of how good roads increase automobile and truck sales. In certain towns within the Tongass and Chugach National Forests of Alaska the construction of ten miles of new roads has resulted in the purchase of 172 new passenger cars. Past records indicate that throughout this area approximately 90 cars are bought for every 10 miles of road. Eighty-six miles of road construction will result in a half-million dollars being spent for cars and trucks.

A detailed study of the relation between road mileage growth and automobile sales in this National Forest region of Alaska has just been completed by District Forester F. E. Bonner at Juneau, Alaska. The results of his investigation are of value, not only for the actual information which they give, but chiefly because they are typical of conditions in other places.

The territories covered by the investigation are located on the southern coast of Alaska, the Chugach forest being farther north than the Tongass. The tabulation shows in detail a number of remarkable facts, some of which have already been emphasized. It brings out clearly the value to the automobile industry of an established road building program for the National Forests of Alaska and shows definitely how American manufacturers might profit from similar developments in other parts of the world.

**F**OR purposes of comparison, the number of miles of wagon roads leading from the six towns—Hyder, Petersburg, Ketchikan, Juneau, Cordova and Seward—are shown as they existed three years ago, or just prior to the time the forest service first entered upon a road building program. The number of passenger cars and trucks owned at that time are shown separately, and also combined.

In addition to these figures are also shown the number of passenger cars and trucks purchased during the past three years; and, finally, an estimate of the number of additional cars that it is predicted will be purchased by the time our present projects are completed. The present projects under way will be completed within three years, or by the end of 1924.

Of the passenger cars added during the past three years it is safe to assume that practically all have been purchased as a direct result of the forest service road building program.

Automobile dealers state that three years ago, with the then road mileage, the sale of passenger cars for pleasure purposes was practically at a standstill. As soon as the prospect of increased mileage was definitely known by the

public, the sale of passenger automobiles began to increase at a rapid rate.

This fact is very strikingly shown as follows: Three years ago there were 51 passenger automobiles under license within the six towns, then having a total of 27 miles of wagon road. Since that time there have been added 26.55 miles of road, constructed from funds provided for road building within the Tongass and Chugach forests. With this increase in road mileage there has been an increase of 168 passenger cars, or an increase of 330 per cent.

**I**N other words, doubling the road mileage has more than trebled the number of passenger automobiles.

Of still more interest is the situation at Juneau. Three years ago there were 20 miles of road, with 38 passenger cars. Since then we have added 5.5 miles of road, and there has been added as a result 95 passenger cars, or approximately 19 new cars for each additional mile constructed. Stated another way—it is at the rate of 172 passenger cars alone per 10 miles of new road.

In the case of trucks (which include merchants' light delivery cars) it is believed at least 50 per cent of the new cars purchased are the result of our road program. There are many small merchants who have not felt justified in owning both a truck and a delivery car, and a family passenger car as well. Hence they have economized by purchasing a light car, which they use for delivery purposes during week days, and on Sundays, holidays and evenings, by adding a few board seats, they take their families and friends on a joy ride to points of interest reached by our new roads.

Three years ago there were 30 trucks in the six towns. To-day there are 117—an addition of 87. Assuming that 50 per cent of this increase is the result of our new roads, we have 43. This number of trucks added to the 168 passenger cars for the six towns gives a total of 211 cars of all kinds purchased as a result of our road building program—or at the rate of over 100 cars for each additional 10 miles of new road.

To complete the projects at present under construction will provide 32.55 miles. It is estimated that as a result 252 additional passenger cars will be purchased. It is also estimated that 56 trucks will be added. Of this number 50 per cent, or 28, will be added as a direct result of additional roads. This makes 280 cars of all kinds that will be purchased by the time the 32.85 miles are completed, or approximately 90 cars for each additional 10 miles of road.

It is believed that the valuation of cars is overly conservative. The valuation of \$700 per passenger car and \$900 for trucks given for Hyder, Petersburg, Ketchikan



and Juneau, with \$730 and \$950 respectively for Cordova and Seward. The latter figures are due to differences in freight rates. These low figures are used for the reason that many of the cars purchased heretofore have been light models, with a large percentage of Fords.

However, with improved roads, with better surface conditions, together with increasing mileage, there is a strong tendency to heavier and more expensive cars.

development of efficient and economical road building in the United States where the majority of his interests lie. But, in a broader sense, he is building for future sales by encouraging road development wherever possible.

It is well enough to talk about "the factors affecting sales," but cars and trucks run on roads, and without proper roads they will not be sold. This detailed study

## Relation of Automobiles to National Forest Road Building Program in the Tongass and Chugach National Forests of Alaska.

(Compiled by Forest Service, D-8, Juneau, Alaska, June 15, 1922)

	TONGASS						CHUGACH				GRAND TOTAL D-8 (both forests)	Percent Increase
	Hyder	Petersburg	Ketchikan	Juneau	TOTAL	Percent Increase	Cordova	Seward	TOTAL	Percent Increase		
<b>MILEAGE:</b>												
Wagon road three years ago (1919).....	none	none	none	20	20	.....	none	7	7	.....	27	.....
Wagon roads built under the direction of F.S. and B.P.R. during last three years.....	9	3.1	4.25	5.5	21.85	109	1.7	3	4.7	67	26.55	98
Total wagon roads at present.....	9	3.1	4.25	25.5	41.85	.....	1.7	10	11.7	.....	53.55	.....
Number additional miles to complete projects now under construction.....	*none	none	5.35	15.0	20.35	49	4.5	8	12.5	107	32.85	61
Total number miles when present projects completed (1924).....	9	3.1	9.6	40.5	62.20	149	6.2	18	24.2	207	86.40	161
<b>PASSENGER CARS:</b>												
Number three years ago.....	none	none	9	38	47	.....	1	3	4	.....	51	.....
Number additional passenger cars purchased since F.S. started its road building program.....	†6	†12	32	95	145	309	3	20	23	575	168	330
Total number passenger cars at present.....	6	12	41	133	192	.....	4	23	27	.....	219	.....
Value:												
‡Approximate value of all passenger cars.....	\$4,200	\$8,400	\$28,700	\$93,100	\$134,400	.....	\$2,900	\$16,790	\$19,710	.....	\$151,110	.....
Estimated number passenger cars that will be purchased by the time present projects are completed.....	25	10	70	125	230	120	10	12	22	82	252	111
‡Approximate valuation of estimated passenger cars.....	\$17,500	\$7,000	\$49,000	\$87,500	\$161,000	.....	\$7,300	\$8,760	\$16,060	.....	\$177,060	.....
<b>TRUCKS (including light delivery wagons):</b>												
Number three years ago.....	†	†	8	15	23	.....	3	4	7	.....	30	.....
Number additional purchased within the last three years.....	†	†	39	37	76	330	9	2	11	157	87	290
Total number trucks at present.....	†	†	47	52	99	.....	12	6	18	.....	117	.....
Value:												
§Approximate value, all trucks.....			\$42,300	\$46,800	\$89,100	.....	\$11,400	\$5,700	\$17,100	.....	\$106,200	.....
Estimated number additional trucks that will be purchased by time present projects are completed.....	5	2	12	25	44	44	6	6	12	67	56	48
Approximate valuation of estimated trucks.....	\$4,500	\$1,800	\$10,800	\$22,500	\$39,500	.....	\$5,700	\$5,700	\$11,400	.....	\$51,000	.....
<b>CARS AND TRUCKS:</b>												
Total number three years ago.....	none	none	17	53	70	.....	4	7	11	.....	81	.....
Total number present cars and trucks.....	6	12	88	188	291	416	16	29	45	409	336	415
Total number estimated increase, including present cars and trucks.....	37	24	170	338	565	94	32	47	79	76	644	.....
Total valuation all present cars and trucks.....	\$4,200	\$8,400	\$71,000	\$139,900	\$223,500	.....	\$14,320	\$22,490	\$36,810	.....	\$250,310	.....
Total valuation estimated cars and trucks, including present number.....	\$26,200	\$17,200	\$130,800	\$249,900	\$424,100	.....	\$27,320	\$36,950	\$64,270	.....	\$488,370	.....
<b>POPULATION:</b>												
RATIO: Total number present cars and trucks to population.....	**237	879	2,458	3,058	6,632	.....	855	652	1,607	.....	8,239	.....
RATIO: Total number present cars and trucks including estimated increase to estimated increase in population, by time present projects are completed.....	8	40	16	10	13	.....	33	15	22	.....	14	.....
	8	40	16	10	13	.....	33	15	22	.....	14	.....

\*Total mileage completed, but roads not yet in final condition for satisfactory car service.

†Figures include passenger cars and trucks.

‡Valuation passenger cars based on average of \$700 per car for Hyder, Petersburg, Ketchikan, Juneau; on \$730 for Cordova and Seward, a/c difference in freight.

§Valuation trucks based on average of \$900 per car for Hyder, Petersburg, Ketchikan, Juneau; on \$950 for Cordova and Seward, a/c difference in freight.

\*\*Population Hyder increased 25%, all other towns increased 10%.

During the past year a great many Buicks, Studebakers, Packards and other cars of this type have been purchased. By the time our present projects are completed there will be considerably over half a million dollars invested in automobiles of all kinds within the six towns.

The ratio of cars owned at present to the population of the six towns as shown in the last census is also given. These figures are very interesting in comparison to other localities in the United States.

In the town of Hyder, for example, there is one car for every 8 persons, a ratio about the same as that which prevails in the states of Ohio and Idaho at the present time. The ratio of persons per car in the town of Petersburg is 40 to 1, being the highest in the table. This same high ratio, however, still prevailed in certain Southern states only a year or two ago. At present there is but one car to 30 persons in Alabama.

The American automobile manufacturer is interested in seeing roads built in all parts of the world. It is immediately necessary that he take an active part in the

of a part of Alaska serves admirably to illustrate how this rule works out in a practical way.

AMERICAN automobile manufacturers have been advised by the Department of Commerce that their method of sending agents advertising matter to South Africa has resulted in a great deal of it being refused by customs officials because of improper marking.

Catalogs or price lists of foreign firms addressed to importers, merchants or manufacturers or public libraries and similar institutions, are on the free list when properly invoiced and no duty is collected. But it is the practice of practically all American firms to put a valuation on such advertising material; because of this the consignee must pay a premium in the nature of a customs levy on advertising materials, which in some instances he has not ordered, with the result that his feelings are ruffled. All catalogs and price lists should be marked "Catalogs and price lists, no commercial value," and if this is done, there will be no duty collected.

## Exports of Passenger Cars, Trucks, Tires,

COUNTRIES	GASOLINE PASSENGER CARS						GASOLINE TRUCKS						PARTS
	Up to \$800		\$800 to \$2000		\$2000 and over		Up to 1 ton incl.		Over 1 to 2½-ton		Over 2½ tons		
	No.	Value	No.	Value	No.	Value	No.	Value	No.	Value	No.	Value	
Europe													
Azores and Madeira Islands.....	2	\$1,020					3	\$1,269					
Belgium.....	357	131,580	28	\$29,652	3	\$8,025	180	48,932	1	\$1,620			\$9,477
Bulgaria.....													
Czechoslovakia.....	3	1,243					1	364					597
Denmark.....	17	9,530	10	10,187					2	3,495			239,332
Estonia.....													
Finland.....	17	7,124					9	2,293					487
France.....	43	21,918	6	7,000	7	23,761			1	1,620			136,866
Germany.....			4	3,935									1,430
Gibraltar.....			1	1,017									
Greece.....	30	13,154	2	2,880	1	2,700	4	1,616					16,111
Iceland and Faroe Islands.....													150
Italy.....			2	2,939	1	2,500							774
Latvia.....					1	5,510							339
Lithuania.....													
Malta, Gozo and Cyprus Islands.....													374
Netherlands.....	47	30,367	26	26,798	4	16,143							4,083
Norway.....	397	90,388	21	19,560	2	5,392	60	17,526					8,706
Poland and Danzig.....	4	2,561											
Portugal.....			14	15,515	1	5,060	1	404					4,232
Roumania.....													
Spain.....	66	36,114	68	82,831	7	22,423			3	3,306			39,124
Sweden.....	717	218,338	84	91,751	1	2,357	303	78,804	4	4,992			16,355
Switzerland.....			31	31,789	11	30,165							804
Turkey in Europe.....	13	3,922	1	953			6	2,064					6,829
Ukraine.....									5	17,000			
England.....	391	216,101			9	34,934			10	10,463			268,205
Scotland.....	2	388											686
Ireland.....	2	600	6	5,700									3,396
Jugoslavia, Albania, etc.....													35
North and South America													
British Honduras.....			1	1,168									208
Canada.....	584	333,329	695	831,266	74	213,016	35	26,242	61	83,714	40	\$135,293	1,647,090
Costa Rica.....	1	750											887
Guatemala.....													974
Honduras.....	3	989					1	399					3,456
Nicaragua.....													84
Panama.....	5	3,032	6	6,585			2	688					5,169
Salvador.....	3	2,172	9	12,313									1,313
Mexico.....	509	222,016	120	121,311	5	14,223	111	35,372	14	27,021			68,298
Newfoundland and Labrador.....			3	3,442									1,565
Barbados.....	5	2,169											896
Jamaica.....	11	5,583	6	5,678			6	3,824	2	3,138			4,509
Trinidad and Tobago.....	10	4,144							3	4,478			6,246
Other British West Indies.....			1	1,595			6	3,020	1	2,200			1,997
Cuba.....	79	36,059	19	23,733	15	35,839	11	3,892			1	2,241	64,741
Dominican Republic.....	7	2,392	4	4,403			1	804	2	5,200			5,163
Dutch West Indies.....	3	1,281											531
French West Indies.....	1	700											2,014
Haiti.....	4	2,558											2,520
Virgin Islands of U. S.....	2	788											510
Argentina.....	100	63,583	47	49,753	14	45,553	2	804					197,639
Bolivia.....													535
Brazil.....	28	20,296	67	68,451	4	10,802					2	1,888	19,234
Chile.....	6	2,184	1	1,421			4	1,616					10,205
Colombia.....	5	1,944	1	1,477									4,075
Ecuador.....	2	828	1	1,000			2	808					1,878
British Guiana.....	3	1,243											1,340
Dutch Guiana.....	2	960							1	475			184
French Guiana.....													130
Paraguay.....	1	504											
Peru.....	9	4,200	2	2,069					2	2,000			3,902
Uruguay.....	30	9,522	3	3,791	1	2,727	15	6,060					11,474
Venezuela.....	28	14,755	9	11,341			2	808					9,604
Asia													
Aden.....			2	2,021									244
Ceylon.....			5	4,433					4	10,250			1,852
China.....	27	20,122											6,019
Kwantung.....	1	500											383
Chosen.....	1	443											1,250
British India.....	37	25,003	15	14,663									14,005
Straits Settlements.....			4	4,286									5,246
Other Dutch East Indies.....													1,724
Portuguese East Indies.....													
Java and Madura.....													3,111
French Indo China.....													471
Hejaz, Arabia and Mesopotamia.....													725
Far Eastern Republic.....													269
Hongkong.....	1	735	4	3,823									2,120
Japan.....	164	85,020	10	14,400	2	5,887	117	50,319	6	18,815	5	13,335	31,137
Palestine and Syria.....	117	52,644	15	18,286	6	11,311			1	1,500			17,965
Philippine Islands.....	17	11,884	1	1,863			1	750					42,977
Greece in Asia.....													57
Siam.....	3	2,172									2	4,688	591
Oceania													
Australia.....	411	262,172	348	368,160	1	2,240	13	9,958	39	49,225	23	43,553	91,500
New Zealand.....	18	14,293	25	27,531			4	4,041	4	4,760	4	9,566	22,918
Other British Oceania.....	2	1,110											1,509
French Oceania.....													735
Other Oceania.....	3	1,770											351
Africa													
Belgian Congo.....	16	6,183					16	6,464					5,664
British West Africa.....	3	2,172	1	972					5	4,431			12,733
British South Africa.....	76	52,923	121	115,434	3	10,560			8	11,352	9	11,490	44,724
British East Africa.....	5	2,924	1	1,234									681
Canary Islands.....	2	1,210	3	3,949			10	4,040					4,602
French Africa.....	7	2,833					1	404					1,740
Egypt.....	55	21,606					1	404					1,222
Liberia.....													
Morocco.....	3	2,172											1,368
Portuguese Africa.....	10	5,423					7	3,550	3	1,522			2,278
Portuguese East Africa.....	1	724	2	1,658									1,520
Spanish Africa.....					1	2,692							
	4,529	\$2,098,067	1,856	\$2,066,087	174	\$513,820	935	\$317,539	182	\$272,577	86	\$222,054	\$3,160,448



TIRES						MOTORCYCLES		AIRPLANES AND SEAPLANES		PARTS	COUNTRIES
Casings		Inner		Solid		No.	Value	No.	Value	Value	
No.	Value	No.	Value	No.	Value	No.	Value	No.	Value	Value	
532	\$7,946	57	\$158			104	\$29,007				Europe
4	170	8	31								Azores and Madeira Islands
4,452	65,554	2,036	3,967	51	\$1,541	23	4,848				Belgium
54	1,164	71	184	20		95	27,517				Bulgaria
253	3,736	281	1,934	10	217	4	1,106				Czechoslovakia
2,367	27,835	25	52			2	1,539				Denmark
16	270	12	35			15	4,356				Estonia
271	3,538	295	493			6	1,783				Finland
266	4,289	277	520			1	345				France
490	7,707	22	93			1	276				German
150	1,806	308	418								Gibraltar
15	208	16	33			147	35,293				Greece
1,453	22,324	601	1,163	42	778	1	267				Iceland and Faroe Islands
2,704	48,066	1,999	5,271	76	2,325	370	96,961			\$20	Italy
14	306	12	20			52	1,425				Latvia
1,208	18,884	277	385	47	1,578	12	3,268				Lithuania
6	201	10	28								Malta, Gozo and Cyprus Islands
5,092	72,206	3,382	6,448	262	7,642	126	33,268				Netherlands
4,801	70,289	2,808	7,230	30	750	86	24,468				Norway
134	2,774	60	160			26	7,139				Poland and Danzig
357	4,271	248	392								Portugal
36,755	367,866	13,759	20,064	511	11,058	110	29,349				Roumania
46	561	36	125								Spain
1,107	15,812	1,040	1,788								Sweden
272	3,982	346	1,668								Switzerland
29	200	42	78								Turkey in Europe
7,366	133,794	6,757	14,548	833	28,012	89	20,437	1	\$2,230	8,135	Ukraine
82	1,252	66	231								England
95	2,480	99	275			2	590				Scotland
71	1,877	58	181								Ireland
21	363	68	121								Jugoslavia, Albania, etc.
74	1,819	430	697								North and South America
594	9,068	248	571	34	858						British Honduras
6,495	85,218	3,965	8,312	280	8,013	12	2,649			5,431	Canada
93	1,742	74	159							1,508	Costa Rica
22	437	60	117	2	38						Guatemala
639	9,076	388	636	30	1,072						Honduras
394	4,876	294	559	21	424	3	765				Nicaragua
76	868	79	191			1	246				Panama
9,421	101,719	13,623	21,581	877	24,525	1	75			80	Salvador
870	10,774	1,094	1,874								Mexico
24	392	77	179	14	570	1	304				Newfoundland and Labrador
246	3,334	115	301								Barbados
206	3,187	211	341	2	37						Jamaica
26	327			20	627	</					

# The Broad Scope of General Motors' Research

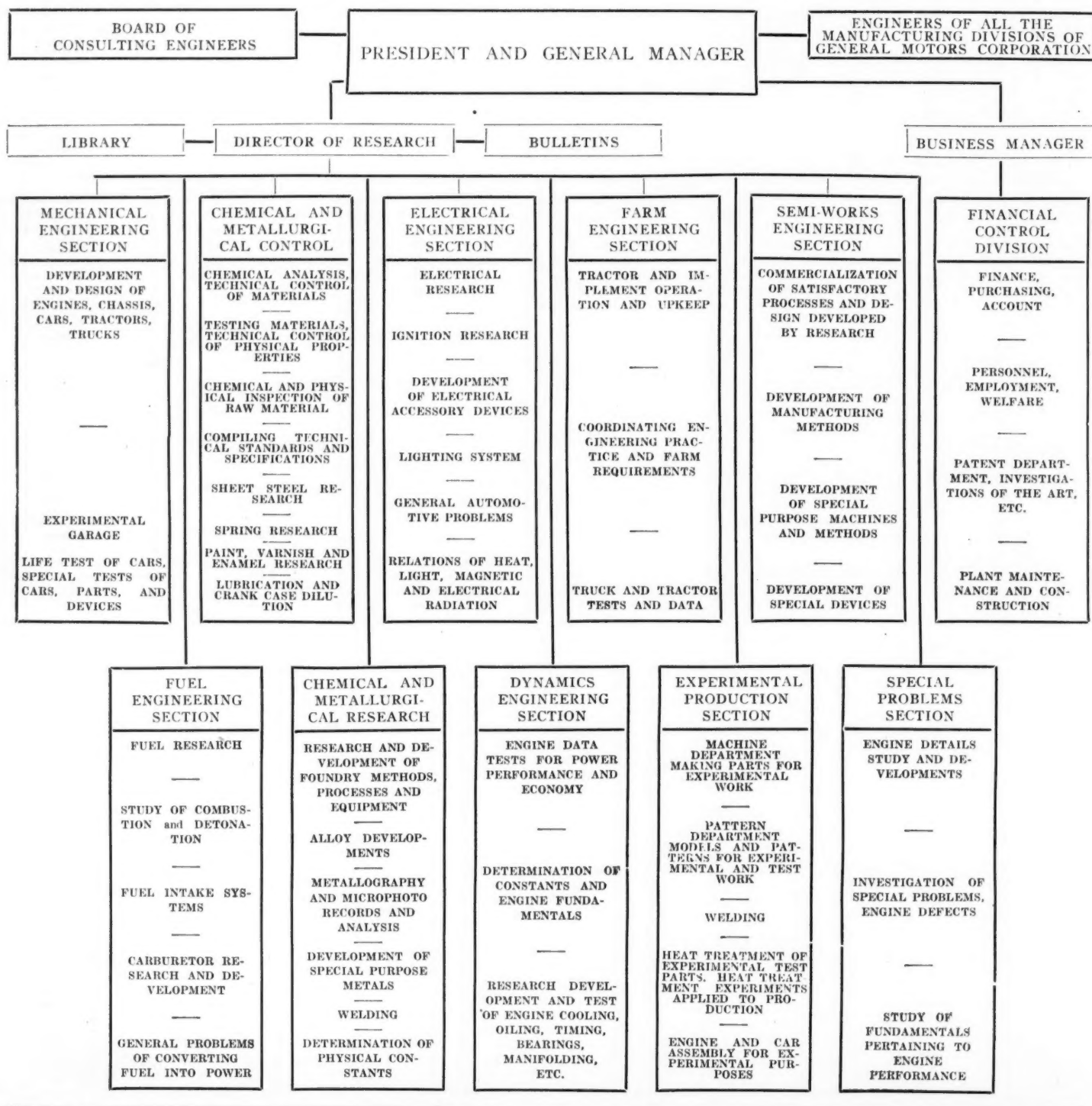
*Here is another outline of the field of automotive research. New items shown in recently published chart.*

**H**ERE is a detailed outline of the research work which is being carried on by the General Motors Research Corporation at Dayton, Ohio. The general scope of this work has been known throughout the industry for some time, but this is the first specific outline that has been made public.

The chart is of special interest for comparison with the chart of Automotive Research Activities, the first outline of its kind, which was published in the Research Number

contained certain items not covered by the General Motors' of AUTOMOTIVE INDUSTRIES on June 8. This previous chart activities, while the accompanying chart contains a number of items, notably the financial control division, not included in the AUTOMOTIVE INDUSTRIES outline.

A comparison of the two is worth while, as a complete outline, in brief form, of the field of automotive research is yet to be built up.







# The FORUM

## Factors Affecting Starting

Editor, AUTOMOTIVE INDUSTRIES:

A careful perusal of the editorial on Better Starting Facilities, in the April 27 issue of AUTOMOTIVE INDUSTRIES, would lead one to believe that the fuel supply was entirely to blame for cases of difficult starting. Why not blame the ignition for its share of trouble. Difficult starting, more often than not, is caused by the failure of the ignition in the first place.

Modern ignition systems leave much to be desired. The fiber block used on the interrupter arm is subject to rapid wear, causes excessive burning away of the contacts and necessitates their too frequent adjustment. The need of adjustment being many times the cause of difficult starting, all due to lack of proper lubrication for cam and block. This is especially true in damp weather, when a coating of rust will form over night on the cam, unless protected by a film of oil, and cause excessive wear on the block. To the operator is left the task of oiling, which he rarely does, or should he oil, frequently overdoes it. It should be possible to keep these parts oiled, including the interrupter arm pivot pin and bushing, by means of a saturated felt wick, fed from a reservoir filled from exterior of distributor housing.

Weak coils, poor wiring connections, leaky condensers, and bad switches all form a prolific source of trouble, for a weak spark will actuate a motor once started, but the best spark procurable is required to fire a cold, sluggish mixture of raw gas, in a cold, stiff motor, with a minimum of trouble.

Carbureters furnish their share of trouble, it is true, for carbureters are the favorite plaything of the average driver, who in time of trouble changes the adjustments to every conceivable position, whether it be at fault or not, whether they know how to set it or not.

It should be possible for a novice to remove a strainer

from a gas tank, in case of stoppage, and to replace it without trouble; as placed now, they are usually inaccessible, even to trained mechanics.

A desirable improvement, in the carbureter choke arrangement, would be some form of automatic choking device operated by a thermostat and regulated by a compensator controlled by suction in intake manifold. The thermostat could be operated by the temperature of either the cooling system or the carbureter hot air pipe. This would remove the need of choking out of the operator's hands, and remove one more impediment to the easy operation of the motor car.

There are other things, too, that dissatisfy the average car owner, chief of which is the so-called oil pumping tendency of so many modern motors. As proof, consider the innumerable number of patented piston rings, each claiming to cure the defect, but no device, however artfully constructed, will remedy a defect in design without altering the design itself. We are too prone, though, to condemn the quality of present-day oils, when the blame really belongs to the designer.

But we are in a rut, the rut of believing the modern motor about perfect, and prefer to blame troubles to outside causes, but perfection is impossible, and the sooner we realize that and get busy and eliminate present imperfections the better. The modern motor itself is imperfect, and so long as we employ a throttle to govern its speed and continue to lose so many heat units to the exhaust, etc., it will continue so.

I firmly believe the constant compression type of motor will be the ultimate type; but it will never be perfected through the use of auxiliary carbureter or valves.

I would like to hear the views of others on these and kindred subjects; it would be for the common benefit.

ARTHUR LA FOUNTAIN.

## Tractive Resistance of Roads

AT a conference called in Washington, D. C., July 14-15, 1922, by the Advisory Board on Highway Research of the National Research Council, consideration was given to the present state of research on tractive resistance of roads, and to the relation of the highway engineer to the automotive engineer in this field of research.

A committee was appointed to draw up a statement of principles, which report was discussed and adopted. The report included definitions of rolling resistance, air resistance and resistance of engine and transmission, and states that the present state of the art indicates that at low

speeds up to 10 miles per hour, a traction dynamometer of the liquid pressure type, or a space-time recorder is considered best fitted for measuring rolling and air resistance. At higher speeds, a space-time recorder or a U-tube accelerometer is most satisfactory.

The following is a list of those who attended the meeting: Prof. C. A. Adams, Prof. T. R. Agg, Dr. H. C. Dickinson, C. R. Ege, H. S. Fairbank, D. C. Fenner, A. T. Goldbeck, Prof. W. K. Hatt, Major Mark L. Ireland, W. S. James, Pyke Johnson, Dean A. N. Johnson, Prof. W. E. Lay, Prof. E. H. Lockwood, Prof. C. J. Tilden.

# More Cause for Worry in Coal Strike Than in Rail Walk-Out

The fundamental difficulties behind the coal strike are of long standing and of far-reaching effect. A temporary settlement of immediate grievances likely to have little effect on permanent stability. Rail strike causes are more superficial in character.

By Harry Tipper

**T**HE railroad and coal strikes fields have been closely associated in the discussions in the public press and in the minds of most of the people, because of the intimate economic relation between the two. They are, however, quite different in their background, the reasons for the difficulty, and the relation they bear to the total industry in each case. The shopmen's unions in the railroad field are comparatively new. They have not carried any great grievance which would bind the men together in a thorough program of development toward their definite aims. The railroad shopmen have been paid at a scale which compares not unfavorably with the skilled workers in other metal trades industries. They have secured a great many privileges which do not require them to maintain the productive pace which other metal trade shops are accustomed to demand.

In fact, the conditions in the railway shops have become onerous from the standpoint of the cost of production. In some cases, the cost of doing the work in these shops represented twice the amount necessary to do similar work in shops where the ordinary productive pace and practice existed.

Because this union was comparatively new and had not become consolidated by the development of important grievances, the leaders found it impossible to accept the rulings of the Labor Board without making an issue thereof. There was no real unanimity in the ranks of the strikers, although the strike vote was very heavily in favor of a walk-out if necessary. The older men in many of the railroad shops did not want to strike and this percentage in some cases reached 50 or 60 per cent of the total workers.

It is true that the railroads had contracted out for a good deal of the work which was ordinarily done in the railroad shops and in doing this, they had gone against the ruling of the Railway Labor Board which had insisted that it was against the regulations of the railroad to do this contracting on the outside. This contracting out, however, was almost inevitable in view of the extreme effect of the cost of doing the same work within the rail-

road shop in accordance with the railroad customs and union privileges, compared with the cost of doing the same work in other metal trade shops, where the unions have been more reasonable and the practice calls for a competitive position on production costs.

It was unfortunate that the railroads failed to make public the position they were in with respect to their repair and production costs in the shops and the reasons for their contracting on the outside.

As usual, the railroads have failed entirely to measure the importance of laying the cards on the table so that

public opinion could be properly formed as to the merits of the issue. From the very beginning, the strikers have made efforts to draw the government into the case and each time the government has issued a statement, the leaders have delayed the negotiations which they were conducting with the railroads.

In the matter of the coal strike, however, the case is entirely different. The miners have had a number of grievances for a good many years, many of which are inherent in the present methods of coal production under

the circumstances which prevail in the coal districts. Almost all these grievances relate primarily to a number of elements outside the control of the miner which prevent him from making enough money, even though the piece rate per ton is fairly high.

The work is too intermittent; it takes too long to get the attention of the foremen; the underground transportation systems are frequently handled without proper engineering consideration, and the records are almost negligible except for payroll purposes, so that the costs are not fully determined.

The general conditions in the coal mine provide a constant series of irritations to the miner in the interruptions in his work, the number of jobs which he must do, the lack of specific supervision, and other items to be found in practically no other business of so important a character. The operators, feeling their position to be sufficiently strong, refused to enter into negotiations for a new agree-

**T**HE railroad strike and the coal strike have been closely associated in the public mind because of their similar economic effects.

The background of the two strikes is quite different, however, as Harry Tipper points out in this interesting discussion of these big industrial troubles.

This article gives a brief, concise picture of the bases of the two strikes, points out the differences between them, and shows the requirements of successful settlements in both cases.



ment at the time specified in the old agreement which was about to expire, and in consequence the miners struck. The strike has now lasted about four months.

So far as it is possible to determine from the information available, the grievances which were really at the bottom of the strike, are not likely to be settled by the negotiations pending, even though the miners go back to work, as they probably will.

This general discussion of the conditions indicates that the two strikes are different in their character and in the background from which they spring. The railroad strike, when it is settled, need not disturb anybody because it is not due to a fundamental difference, and the conclusion of the strike is not likely to disturb the transportation situation further. In the coal industry, however, the fundamental lack of organization in the management and operation of the coal mines, must be tackled sooner or later and, until it is tackled with intelligence and energy, the present grievances will remain to disturb the future relations between the miners and operators regardless of the conclusion of the present strike, or the actual terms of settlement.

**F**OR this reason, the coal strike is a much more serious matter than the strike of the railroad shop men. The coal business is a basic industry. The comfort of living, all the activities of society, and industry, depend upon a continuous supply of coal from the mines. No single activity can proceed for more than a limited period without this supply. The inconvenience which we suffered during the war from the slight amount of coal rationing that was necessary, gives some little indication of the disastrous results of a prolonged interruption in the production of coal.

No industry demands from its position and importance so careful a consideration of its organization and management and the relations between the owners and the employees. Yet this industry, by the circumstances of its growth, and the precedents of its regulation, is organized

in a haphazard manner which would not be tolerated in any other line of industry involving engineering considerations. There can be no stability in the coal business so long as these conditions prevail and the manufacturer of commodities can have no assurance that the coal required for his power will be forthcoming for any great length of time so long as the coal business is handled under the present methods of development and management.

**T**HE progress of the matter furnishes a striking example of the futility of arbitration of a compulsory character, of government proclamation and military protection to assuage the results of acute differences between employer and employee. The absurdity of the attitude on both sides, particularly the absurdity of the operators in refusing to negotiate at the termination of the old agreement, is illustrated by an examination of the history of previous settlements.

Practically every general grievance has been settled over the conference table, either without a strike or at the end of an expensive interruption. Only one or two cases exist in the history where the men have unconditionally surrendered without negotiations, and these are not sufficiently important to affect the general case.

In some lines of business and in some establishments the owners have developed a method of negotiation with their own employees to the point where they can settle their own grievances. Except for these cases, the general grievances must be settled by the conference method. There is no escape from this necessity. Under these circumstances, the four months of idleness in the coal industry is a very scathing criticism on the leaders on both sides, because they refused to recognize the necessity of conference until idleness and the possibility of disaster demanded a re-opening of the case.

The present indications are that the progress in the situation has induced the miners and operators to come together for negotiations with the prospect that a settlement will be reached in due course.

## Door Lock Bevel Standards Suggested

**A**T the summer meeting of the Automobile Body Builders' Association, held at Detroit, Will H. Ritter, second vice-president and sales manager of the English & Mersick Co., called attention to the desirability of standardizing door lock bevels. He stated that during the past two years his firm had been asked to furnish locks with bevels ranging all the way from a right angle to 12 deg., two sizes called for even involving fractions of a degree.

The range in sizes, he claimed, places on the lock manufacturer an unnecessary burden and adds considerably to the manufacturing cost. Catering to individual ideas in lock construction tends to make a jobbing shop out of a manufacturing plant. To secure the necessary bolt throw with bevels widely different, three or four sets of patterns and tools are required for the bolts, cases, covers and other lock parts.

Mr. Ritter's firm during the past ten months brought out two new locks, and in doing so endeavored to establish convenient standards for bevels. Before the necessary tools were built the matter was taken up with three body engineers who are on Standards Committees. The discussions led to the conclusion that it would be a forward step to make closed body locks in two bevels, 6 and 9 deg. Given a tolerance of 1 deg. each way, these two sizes will fit doors with bevels of from 5 to 10 deg. in-

clusive. That is a 6 deg. bevel lock will accommodate 5, 6 and 7 deg. doors, and the 9 deg. bevel lock will fit 8, 9 and 10 deg. doors. Mr. Ritter expressed the opinion that all would appreciate definite standards on bevels. In placing the new lock with fifteen manufacturers, the two bevels of 6 and 9 deg. had proven entirely satisfactory.

For open cars a 5 deg. bevel lock, which will serve on doors of 4, 5 and 6 deg. bevel, was found satisfactory. A consideration of, and early action on, the proposed standard was asked of the Standards Committee.

**A**SPRING cover enclosing the spring from clip to shackle, which has been on the market abroad for three years, has recently been introduced in this country. It is known as the Wefco spring cover.

Underneath the invisible fastening a tongue of leather runs the full length of the cover, so that there is double protection throughout and the cover cannot wrinkle. Leather flanges or tubes on both sides of the straps grip the ends of the spring tightly when the cover is buckled up and prevent water, dirt and dust from getting in. The covers are laced with cable cord. As regards lubrication, before fitting the covers, the springs are smeared with a suitable grease, which requires about 2 lb., and this grease is said to last indefinitely.

# AUTOMOTIVE INDUSTRIES

## THE AUTOMOBILE

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## Trade Thrives Despite Strikes

RAPID progress is being made in the revival of trade and industry notwithstanding the complications resulting from the mine and rail strikes. Considering the disturbing effects of the industrial controversies now under way, the advance recorded in recent weeks has been phenomenal. It demonstrates the fundamental strength of the factors essential to permanent growth.

No academic discussion of the subject is necessary to prove the point. Car loadings are an unfailing barometer of business and those for the week ending July 15 when both strikes were in full swing, tell a mighty significant story.

Excluding coal, the loadings of all other commodities for that week totaled 783,573 cars. This figure has been exceeded in the history of American railroads only in the weeks of September and October of 1920 when loadings of miscellaneous freight established a new high record. Moreover, the figure of

783,573 is only 8295 cars, or about 1 per cent, under the total for the same commodities loaded during the week of Oct. 15, 1920, when the peak was reached.

No further evidence is needed to show the extent to which the United States has come back.

With these figures before them, automotive manufacturers may well feel complete confidence in the future.

## A Time for All Things

THE attempt of some of the railroads to form "company unions" in opposition to the trade unions during the present strike furnishes another excellent example of how *not* to make employee representation plans effective. The same basic principles apply for the railroads as for similar industrial relations plans in the automotive industry, so that automobile executives can well learn a lesson from the present railroad dispute.

The success of any employee representation plan, regardless of its detailed mechanism, rests primarily upon the good faith of the management and the ability of the employer to convey the presence of that good faith to the employees. The plan must be installed with the fundamental idea of improving conditions for both employees and employer.

Past experience with such plans has made many workers suspicious. The plans have sometimes been installed purely in an attempt to break trade union power and thus render employees, in a given case, less powerful to fight economic battles with the management. In various ways these plans have been used to reduce the economic fighting power of the worker, rather than to provide an opportunity for true co-operation, which involves sacrifices and compromise on both sides.

Feelings of suspicion and anger are always at a white heat during a strike. There is probably no worse time at which to attempt to establish an employees' representation plan, especially when the strike consists of an economic battle between the trade union and the company. It would seem almost obvious in such a case that the primary object of the new movement was to reduce the power of the trade union and make it possible for the employers to have their way more readily.

All this is entirely beside the question of the right or wrong of the present controversy between the railroads and their striking employees.

The point is simply made that successful employee representation plans in the past have not been those established under the stress of strike conditions when the spirit of co-operation between management and men is almost entirely lacking.

A real desire for constructive co-operation is essential to the success of any such plan. Consequently, the best time to inaugurate such plans is when employees are apparently entirely satisfied.

Then the management cannot be accused of any ulterior motive in suggesting a co-operative plan of handling industrial relations. The management that is interested enough in industrial relations to work



with and install such a plan during times of labor contentment, indicates by that very fact that it has in mind broad ideas of constructive co-operation and mutual benefit.

These thoughts are specially interesting to automotive executives at this time, because of the comparatively quiescent state of labor troubles in the automotive industry.

## Used Cars Still Problem

**N**OT so much has been heard for the past three months of the used-car problem, but it has not been permanently solved. An enormous number of new cars have been sold since the beginning of March and a very large proportion of them, especially those selling at more than \$1,000, have been replacements. In almost every case there has been some kind of trade.

Conceding that a considerable number of those turned in were well fitted for the junk pile, there remain a great many thousands which will be good for a long time to come. Many dealers assert, in fact, that a surprising proportion of new-car sales were in exchange for vehicles which had been operated only a few months. This has tended to keep down dealer profits.

There seemed for a time to be an insatiable demand for used cars, but that demand is now falling off in some sections and dealers are complaining that their stocks are piling up. Many of them probably would not sob bitterly if they encountered greater difficulty in obtaining new cars for a while. They could then liquidate their used car stock.

Manufacturers who try to force on their dealers for the remainder of the year more cars than their territories can absorb readily will be making a mistake. No permanent advantage will be gained by trying to force the market. It is certain to be good enough, so there will be no reasonable ground for complaint.

## Better Oil Pumping

**A**LMOST every new departure in design carries in its train a set of special difficulties. Thus the wide-spread adoption of pressure lubrication in recent years has brought back the bugbear of over-oiling which had been practically overcome in connection with circulating splash lubrication. With this latter system the amount of oil thrown onto the cylinder walls depends only on the level of the oil in the splash troughs, the size of the dippers and the speed of the engine. None of these factors varies as the engine grows older and begins to show signs of wear. In a pressure feed lubricated engine, on the other hand, the pressure being maintained constant by the relief valve, the amount of oil passing through the bearings increases as the latter become loose. Therefore, whereas an engine with splash lubrication that oils properly when it leaves the factory is almost certain to continue to do so as long as the piston and rings are not unduly worn, this is far from being the

case with the pressure feed lubricated engine.

To a certain extent the trouble can be cured by the provision of a scraper ring and of an oil groove and return holes in the piston. There is some difference of opinion as to whether a scraper ring at the lower end of the piston, below the piston pin, is of special benefit in this connection, some engineers holding that the rings at the top end have the same effect, and that the lower ring therefore is merely an extra expense and an undesirable addition to the reciprocating weight. However, there seems to be general agreement regarding the value of the oil return holes, and few engines are now turned out that are not provided with them.

There could be no better proof that oil pumping has given trouble on pressure lubricated engines under certain conditions than the general adoption of a pressure relief actuated by the manifold suction. When the throttle valve is nearly closed the amount of vacuum in the cylinder during the intake stroke is comparatively high, and more of the oil splashed onto the cylinder walls is drawn into the combustion chamber than would otherwise be the case. Although the provision of pressure control actuated by the intake vacuum tends to reduce oil pumping under conditions particularly favorable thereto, it does not overcome the effect of wear in the bearings.

The best remedy for the trouble mentioned would seem to be to reduce the pressure to which the relief valve is set as soon as excessive oil consumption and smoking are observed. The aim should be a constant rate of circulation for a given engine speed, and with the resistance of the oil passages through the bearings reduced by wear, the same rate of circulation can be maintained with a lower pressure on the oil. Manufacturers, however, are loath to instruct users to reduce the oil pressure relief valve setting, for fear this might sometimes be done when conditions did not warrant it, with disastrous results to the engine.

## World Automobile Registrations

**T**HE Automotive Division of the Bureau of Foreign and Domestic Commerce has just completed a survey of automobile registrations which confirms very strongly the figures first compiled and published by AUTOMOTIVE INDUSTRIES last February and published in revised form a few weeks ago. Further revisions will be made from time to time.

The Department of Commerce total is 12,530,416, while the revised figures given by AUTOMOTIVE INDUSTRIES on July 20 totaled 12,649,793.

The comparative closeness of the two figures, separately compiled, serves to check the accuracy of both counts. It is natural that the revised AUTOMOTIVE INDUSTRIES figures should be somewhat higher than the Department of Commerce count, since the former figures were more recent in many cases.

A continuance of such investigations will provide the American industry with a constantly fresh and reliable account of automotive progress in other countries and will permit more accurate marketing efforts in foreign fields.

# Output in July May Exceed 200,000

## R. R. Priority May Affect Production

### Manufacturers Fear Curtailment of Steel Supplies—Strike Effects Uncertain

By JAMES DALTON

NEW YORK, Aug. 1.—Production of passenger cars and trucks for July probably will approximate a little more than 200,000, or around 75 per cent of the record figure of 288,000 established in June. Output of some companies will be practically as large as it was last month, but others are falling somewhat behind.

The expected seasonal decline in retail sales has become apparent, but it has not been sharp and is considerably less than the average for the last few years. Unless the situation is seriously complicated by the mine and rail strikes it is expected that business for the third quarter will approach 75 per cent of the second quarter. This would mean a somewhat larger output than in the third quarter of 1921, which was the best of that year.

Automotive manufacturers are not as much disturbed about their supplies of coal as they are about the effect on the steel industry of the railroad priority order of the Interstate Commerce Commission. They were forewarned of the miners' strike by their trade associations and laid in surplus supplies which are standing them in good stead. The priority order is something over which they have no control, however.

#### Output Hinges on Steel

If steel mills which supply automotive manufacturers are compelled to close or curtail their production sharply because they are unable to get coal or cars, the effect upon automobile output naturally will be serious. Car and truck manufacturers have their inventories extraordinarily well balanced and they are well covered by commitments, but if steel is not forthcoming they cannot continue indefinitely to turn out motor vehicles in large volume.

No serious complaint has come from the Detroit district of inability to obtain cars in which to ship finished

(Continued on page 242)

## Business in Brief

NEW YORK, July 31.—The evil effects of the coal and railroad strikes continue to cast a shadow over the business world, which is feeling the blight of mounting prices or a scarcity of fuel. Freight congestion is increasing.

Industry is feeling the congestion of shipments and the diminishing coal pile, especially in the metal producing plants which are located in the central west. This has resulted in more cautious buying, and although in some lines, where goods are needed for immediate use, there has been considerable activity, caused by the fear of a possible complete or partial blockade of production or shipment.

The coal situation has resulted in more blast furnaces shutting down and steel making operations have been slowed. The lack of fuel has caused more lake shipping to go out of commission, and the use of fuel oil has extended to many industries.

Woolen fabrics are active and orders numerous, while in New England the granite and textile operatives have returned to work. There is a heavy export demand for wheat, caused by the recent low levels, while the buying of materials by the farm implement men makes things interesting in that branch of industry. July's mail order buying exceeds that of a year ago. Some crops are good. Harvesting for winter wheat is nearly over and that of spring wheat has begun. Oats look well, and corn and potatoes are promising. Cotton is lower, based on better crop advances. Sugar has reached a new high.

Car loadings are the best of the year, notwithstanding the strike. Not counting coal, they totaled 783,573 cars during the week of July 15.

In the stock market industrials and rails showed substantial advances and produced prices higher on the average than a week previous. Bonds were firmer, money easier and exchanges steady.

Bank clearings for the week ending July 27 aggregated \$6,584,373,000, a loss of 6.7 per cent from the previous week, but a gain of 21.8 per cent over the same week a year ago.

## Plants in Wisconsin Working Normally

### Scarcity of Coal Only Thing Disturbing Automotive Manufacturers Right Now

MILWAUKEE, July 31.—The lack of any favorable developments of a tangible nature in either the railroad or coal strike during the past week has created considerable apprehension among the automotive as well as other industries in this territory.

This fear grows largely out of the danger that may soon be encountered in securing supplies of fuel as well as some of the important raw or semi-finished materials manufactured at distant points. In other respects it is felt that receipts and shipments could be handled by motor truck, which already is being done to some extent.

Unless action comes quickly to effect a resumption of coal production and deliveries of fuel are speeded up, Milwaukee and northwest industries generally face the worst shortage of coal in history. Milwaukee is the distributing point for virtually all coal consumed in the north central states, and local docks have received so far this season only a very small part of the normal supply, which usually comes by great lake vessels. This shortage is due to lack of mining output.

#### No Decline in Activity

In the meantime production of passenger and commercial cars, units and parts and automotive equipment generally is going forward at a steady rate. There has been no loss and no decline in activity, save that the call for parts and equipment is less feverish. Demand, however, is well sustained, but now is largely on a contract basis, with shipping instructions more regular and definite. In the earlier months delivery specifications came with a rush at frequent intervals. Now it appears that the trade has settled down to an even basis. Manufacturing schedules are laid out for three to six, if not nine or twelve months ahead, and purveyors of parts and equipment have been enabled to lay out their production schedules on a similarly more definite basis.

Retail sales of passenger cars in July so far as records obtainable to-day tell the story, made a remarkably good showing in comparison with figures for the same month in previous years. There are few dealers who cannot show a gain ranging from 25 to 300 per cent over the sales in July last year. Generally speaking, sales were only a little below June.



# Plants Keeping at Capacity Output

## Volume Production to Hold in August

### First Paring of Manufacturing Schedules Will Be Reserved for September

DETROIT, July 31—When compiled production figures for July will show that business in this month has maintained a very even pace, and though the rush of the second quarter of the year has generally subsided, there still is sufficient buying to keep factories at about capacity output.

Releases to parts makers at this time would indicate that August will continue volume output, and that the first definite paring of schedules will be reserved for September.

#### Output Below June

Several companies will show an increased output in July, but the majority will run considerably under the total for June. The companies showing gains are those which have been delayed by material shortage in the earlier months, or those which, in bringing out new models, were unable to get into volume production previous to this time.

Though the majority of companies have come abreast of requirements from dealers, there are a number which are from one to two months behind on deliveries of certain models. Packard is behind on all models of single six; Maxwell is behind on most models; Lincoln is two months in the rear; Ford and Dodge are behind on closed models particularly; Studebaker is behind on most models; Buick on sport and closed. Practically every company is enjoying a firm demand in all models.

#### Falling Off in East

Buying in eastern cities has shown a seasonal falling off, but it is holding up good in states in the midwest and is declared to be opening up brightly in some of the farming zones. Dealers in eastern cities are showing a desire to take all the closed cars they can get for the fall demand, this being especially true in the large Metropolitan districts. As a result some factories have been compelled to send most of their closed cars into this territory, though there is an insistent but smaller demand for closed cars throughout the entire territory.

#### M. A. M. A. CO-OPERATING

NEW YORK, Aug. 1—The traffic department of the Motor and Accessory Manufacturers Association has sent a bulletin to its members calling their attention to the fact that automobile manufacturers in the Detroit district are beginning to experience much difficulty in getting automobile cars in which to ship their finished products. As a measure of co-operation, members of the M. A. M. A. are urged to ship their products as far as possible in automobile cars so that they will be available in the Detroit territory for the shipment of motor vehicles.

## Many Important Developments in the Electric Motor Car Field Soon to Appear

By A. C. DOWNING,

Vice-President and Sales Manager, Detroit Electric Car Co.

Detroit, July 31.

**T**HERE are a number of developments in the electric motor car field which will soon be coming through. Most important is the development of a new type of storage battery which will be lower in price and more efficient than the present type.

This battery will in all likelihood be of an interchangeable type and will be rented rather than sold with the electric car proper. When it requires repair it can be removed and another battery rented, the change requiring only a limited time and not tying up the use of the car.

By renting the battery, the first cost of the car will be reduced to a considerable extent, and the new plan will also have the effect of permitting an owner to pay as he rides, rather than as now paying everything at one time. Bills for electricity, coming all at one time, have tended to limit the popularity of electrics, in that it makes them appear expensive to operate in comparison to gas cars where the expenditures are spread out.

There will also be wide changes in the types of bodies now associated with electrics. We are at present working out plans for a series of body types which will give to electrics the body lines of gasoline cars, without, however, the long wheelbase that gasoline cars have.

The development of a front wheel drive electric is an important step in our branch of the industry as it opens up a new field of possibilities. With it many changes can be made, and with the new storage batteries, increased speed and wider touring range will be obtained. The development of molybdenum steel also will have an important part in making the electric a more important vehicle in the automotive field.

With the new body types many changes will be possible. To this time the coach work of the electrics has been held to the very highest mark, and this is largely the reason why there have been no electrics in the medium price car field. Then, too, all electrics to this time have been of the enclosed variety, a higher priced vehicle necessarily than open models.

Among the new body types which we are considering are cars with victoria tops and also enclosed cars of the chauffeur driven variety, something there has never been to this time in electrics. We believe that cars of this type would have instant popularity in the Latin countries, and also in many countries where the gasoline supply is limited and high priced.

The economy of the electric vehicles is being demonstrated every day by commercial electrics working with gasoline commercial cars. Through these the popularity of electric passenger cars is rapidly growing among the class of people to whom economy of operation is an important consideration. As a town car, owner driven, it holds its largest measure of popularity in the large cities of the United States, and is replacing gasoline cars in many instances.

We have confidence that there will be an increasing market for electric cars as time goes on. That this market is not larger at this time is mostly the fault of the electric car manufacturer, who has not taken advantage properly of the possibilities for development.

## American Steam Truck Contracts for Factory

ELGIN, ILL., Aug. 2—The American Steam Truck Co. of Chicago, manufacturer of the American steam passenger car, has signed a contract for the purchase of the plant of the Duty Motor Corp. here. The Duty company was established a year and a half ago to manufacture trucks here, but encountered financial difficulties and only a few trucks were made.

The plant has more than 22,000 sq. ft. of space and is said to be well adapted for motor car manufacture.

#### POSTPONES PARENTI SALE

BUFFALO, July 31—Judge Hazel postponed the hearing on the petition to have the sale of the Parenti plant to the Hanover company declared void until Aug. 4 at 10 a. m.

## Studebaker Profits Bring Big Dividends

Regular Quarterly Declaration  
Made, with 6 Months' Sales  
Reaching \$73,422,862.25

SOUTH BEND, IND., July 31—At their meeting to-day directors of the Studebaker Corp. declared the regular 1½ per cent quarterly dividend on preferred stock and 4 per cent on common payable Sept. 1 to stockholders of record at the close of business Aug. 10, 1922. The directors decided to put the common stock on a regular 10 per cent basis and to pay extra dividends as conditions permit, hence the 4 per cent declared to-day covers the 2½ per cent regular quarterly dividend and a 1½ per cent extra.

The total net sales of the Studebaker Corp. and subsidiary companies for the past six months ended June 30 amounted to \$73,422,862.25, and the net profits derived therefrom, with other net income, after reserves for increased depreciation but before income tax reserves, amounted to \$12,686,763.07. Reserves for United States and Canadian income taxes of \$1,530,362 reduced the net profits to \$11,156,401.07. These net profits exceed the net profits for the entire year of 1921, \$10,409,690.80, by 7.2 per cent and exceed also by 9.6 per cent the combined net profits of the first four years of the corporation's business, 1911 to 1914 inclusive, which amounted to \$10,181,266.99.

President Erskine anticipates that the sales of the last six months of the year will approximate 75 per cent of the sales of the first six months. The company will enter 1923 well equipped to meet the expected keen competition. Additions to the South Bend plants and extensions of the plants in Detroit will give the company a production of 160 more cars per day than it now has. Then the combined plant capacity will be 600 cars a day or 150,000 per annum.

## Industry Interested in M. A. M. A. Meeting

NEW YORK, Aug. 1—This year's convention of the Motor and Accessory Manufacturers Association at Buffalo, Sept. 13, 14 and 15, will be a real congress of the automotive industry. In view of the record-breaking production of cars and trucks, executives are eager to survey the trade horizon and exchange viewpoints with leaders in all branches of the business. The opportunity for this sort of discussion will be afforded at the various general sessions and departmental conferences at the convention.

Alfred Reeves, general manager of the National Automobile Chamber of Commerce, will speak on "Trends of the Industry and the Outlook for 1923." The discussion following this address will be lead by A. H. D. Altree, vice-president

## MASS. MAY LEGALIZE GREEN CROSS EMBLEM

BOSTON, Aug. 1—Massachusetts physicians have displayed an unofficial green cross on their cars for several years, believing that it gave them some leeway in traffic when on emergency runs.

Speeders and non-medical men have made use of the green cross, and the legislature will probably be asked in its next term to prohibit the use of such an emblem except by a duly registered physician and through the office of the Motor Vehicle Registrar.

Officials state that bearers of the green emblem have no better standing at the present time than those without the cross.

of the American Bosch Magneto Corp.

A topic of timely interest "Integration and Mergers in the Automotive Industry," will be discussed by C. A. Dana, president of the Spicer Manufacturing Corp. Dana is an authority on this subject, because he has been a leading figure in several important consolidations during the last few years.

T. M. Simpson, credit manager of the Continental Motors Corp., will speak on "How Creditors Can Aid in Rejuvenating and Reorganizing Embarrassed Companies." One or two bankers of national reputation will address the convention on financial problems of the automotive industry. Several other topics and speakers assigned to discuss them will be announced later.

## STEWART-WARNER EARNINGS

CHICAGO, July 29—The largest earnings in any quarter were reported by the Stewart-Warner Speedometer Corp. for the three months ending June 30. The quarter's earnings were \$1,605,267, amounting, before Federal taxes, to \$3.38 a share. This was more than annual dividend at the present rate of \$3. Earnings for the first six months of the year were \$4.65 a share, as compared with \$1.37 for the first six months of last year. Officials of the company state that business is continuing good and that there are no indications of any material falling off.

## THERMOID OPENS NEW BRANCH

KANSAS CITY, MO., July 31—A branch of the Thermoid Rubber Co. has been opened in the Lathrop Building, Tenth and Grand Avenues, with H. J. Campbell in charge. Mr. Campbell formerly was the Thermoid representative in the Middle West. He now assumes the title of district manager, and his branch will care for the sales in Missouri, Kansas, Nebraska, North Dakota, South Dakota, Montana, Wyoming, Colorado, Oklahoma, Arkansas, Texas and the northern portion of Louisiana. These states formerly were handled out of the Chicago office.

## Coupe Passes Sedan in Ford Production

Demand for Closed Cars 201 Per  
Cent Greater Now Than  
in 1919

DETROIT, July 31—For the first five months of 1922 the Ford Motor Co. reports an output of 103,048 closed cars—44,413 sedans and 58,635 coupes. Based on this production for five months, it is figured that the Ford company will turn out a total of 247,308 closed cars for the year, or 201 per cent greater than in 1919.

It is only this year that the demand for the coupe has exceeded that of the sedan. In 1919 of the 700,000 passenger cars produced by Ford, 33,771 were coupes and 48,318 sedans; in 1920, of the 977,000 passenger cars, 75,948 were coupes and 109,487 sedans. In 1921, of 875,000 production, there were 95,682 coupes and 129,887 sedans. Estimating the total production at 1,000,000 this year, it is figured that 140,724 will be coupes and 106,854 sedans.

In a percentage way 11.7 per cent of the passenger cars in 1919 was closed; in 1920 it was 18.9; in 1921 25.7, while in 1922 it will be 24.7 per cent, it is estimated.

The demand for closed jobs is so great that the Ford company finds itself 100,000 behind in orders for this type, caused by inability to get the bodies fast enough. If this obstacle could be overcome, it is estimated by a Ford official that the sale of closed models for the year would be between 35 to 40 per cent of the total passenger car production, instead of about 25 per cent of the 1,000,000 passenger cars the company expects to turn out this year.

## Milwaukee Raises Big Fund for Fokker

MILWAUKEE, WIS., July 31—Practically all of a \$100,000 fund being raised by Milwaukee manufacturers and other business men to make a continental survey of aircraft possibilities in a commercial way has been raised. The survey will be made as the forerunner of the plans of the Milwaukee Association of Commerce to induce A. H. G. Fokker, the famous Dutch aircraft engineer and builder, to locate his proposed American plant in Milwaukee.

Immediately after the fund is raised a managing director and committee of five will be named by a nominating committee consisting of Charles F. Pfister, financier, Oliver C. Fuller, president First Wisconsin National Bank, and Clarence R. Falk, president the Falk Corporation.

The proposed investment in an aircraft manufacturing plant will be \$2,500,000 and an additional \$1,000,000 will be invested in an aerial transportation company.



## Brill Bringing Out New Type Bus-Car

### Pennsylvania Railroad May Add Vehicle to Its Equip- ment

PHILADELPHIA, July 31—Pennsylvania Railroad officials are experimenting with the latest type of gasoline-driven engine, with a view to adding to the road's equipment. The engine, manufactured by the J. G. Brill Co., is a combination locomotive baggage car and automobile bus. It is intended for use on branch and short-line railroads.

Leaving Broad Street station at 10 a.m., on a recent test, the officials were taken to Chestnut Hill and thence on the Cresheim branch to Whitemarsh. From there they returned to North Philadelphia and then over to the Bustleton road. If they decide to adopt the new type bus-car, it will be used on the Bustleton and Cresheim branches, upon which traffic is light.

#### 28,000 Lbs. Weight

This invention, according to the Brill officials, is considerably more economical than an electric, or steam, motivated train. It can make 50 miles an hour and average from five to six miles on a gallon of gasoline. Like an automobile, it is operated with gear shifts, but has six speeds, instead of three. On a sharp grade the gear is shifted just as it would be in an automobile. The car weighs nearly 28,000 pounds and contains a four-cylinder engine of 68 horsepower.

The "scooter" used in the trial was one of several which are to be put into operation by the Brill company immediately, on the Fonda, Johnstown & Gloversville line in New York state. It carries forty-one passengers. There are special compartments for baggage, similar to some types of interurban, or long distance, trolley cars. The motorman, or chauffeur, has a shrill motor horn and a special whistle. The cost of the car complete is \$16,000.

It is claimed for it that it can be operated for one-fifth the cost of a steam train and it requires a crew of only two men.

### New Model 890 Cole Marked by Features

INDIANAPOLIS, Aug. 1—Shipments are being made on the new series Cole 890 which, while not radically different from the former models, has many refinements and now is furnished with extra equipment that hitherto has been optional at an increased price.

An improved frame with large springs and modified suspension, together with an envelope manifold and a new carburetor, are among the mechanical refinements of the car. Six wheels, with side mountings for the extras, is now standard, the buyer being allowed choice of

wood, wire or disteel types. A new type Gemmer steering gear, with wood wheel without quadrants, is another detail that will engage the attention.

The body style has been refined and the external details of the job show many new ideas from the windshield to the rear curtain window that is 8 inches wider than the one on the former model. The price of the seven passenger job of the new series 890 is \$2,685. The price of the former model was \$2,785, including equipment.

### Southern Territory Improving Steadily

ATLANTA, GA., July 31—A survey of automotive sales conditions over the Southeast from reports of Atlanta distributors evidences the fact that business has proven entirely satisfactory since the early spring, and that there has been a steady improvement from week to week to the present time in the sale of both new and used passenger cars and trucks. The latter business has been especially satisfactory as compared with the slack in truck sales the industry experienced at this time a year ago, and the outlook now is for increased truck demand, as every line of business and industry over the South has experienced notable improvement the past three months.

With cotton prices holding steady around a figure that insures the grower a decent margin of profit, there is a much better feeling among the farmers. Furthermore, other farm prices are satisfactory, and financially the southeastern farmer is in a better shape than he has been in more than two years. This is resulting in improved truck and tractor sales among the smaller dealers and a pick-up also in other automotive sales.

#### WESTERN RESERVE EXPANDING

MILLEN, GA., July 31—Officials of the Western Reserve Cotton Mills Co. of Georgia, subsidiary organization of the Mason Tire & Rubber Co., Kent, Ohio, advises that the plant has ordered several thousand dollars' worth of new weaving machinery, and that when installed the weaving capacity of the mills will be greatly increased. Evidence of good business in tire sales is indicated by the fact that mills are operating by day and night shifts at full capacity manufacturing tire fabric exclusively.

#### FORD MINE SHIPS FIRST ORE

DETROIT, July 29—The Ford Imperial mine in the Michigan Upper Peninsula began shipments of iron ore this week to the River Rouge blast furnaces. The mine was taken over by the Ford interests a year ago and has been under development since. The mine differs from others in the Michigan iron and copper fields in that the miners walk down and up stairs to and from work, instead of being hauled up and down in cages.

## Railroads May Gain Control of Trucks

### Possible Action of Massachusetts Commission Scares Commer- cial Vehicle Makers

BOSTON, July 31—The Public Utilities Commission of Massachusetts has announced that it will take up the question of motor transportation in conjunction with other such matters in September. The legislature this year passed a resolution to have an investigation made regarding the use of motor vehicles on the highways, and principally motor trucks. This was the aftermath of the failure of Commissioner John N. Cole to secure a big increase in fees on motor trucks and cars, and a gasoline tax.

Also veiled in the resolve is power to recommend that the motor trucks may be put under the jurisdiction of the Public Utilities Commission, and in a way be classed as common carriers. In that event the railroads would be able to exercise some control over the trucks.

#### Operation Has Difficulties

A couple of years ago an attempt was made to amend the law along these lines, and it was discovered that a joker in the present law prevents common carriers passing the lines of other such carriers at grade. That would mean bridges above or tunnels underneath every steam and street railway in the state, or the barring of trucks everywhere. It was killed. Now, if the Public Utilities Commission takes over the jurisdiction of truck operation there will be a lot of snags.

Therefore makers of motor trucks, the N.A.C.C., the N.A.D.A. and other bodies are expected to send all the data available about truck transportation to the commission at the State House, Boston, Mass., right away, and then arrange to be represented at the hearing on Wednesday, Sept. 27, next. Otherwise there should be no alibis if the railroads are well represented and have things their own way. Whatever the Public Utilities Commission recommends will have a good chance to become a law next year.

### Establishes Pension System for Employees

PHILADELPHIA, July 31—The Electric Storage Battery Co. has approved a pension plan for its employees. A pension fund of \$350,000 has been deposited with the Pennsylvania Co. A male employee who has been in the service of the company for thirty years is eligible for a pension. If his average earnings for the ten consecutive years of highest pay were \$2,000 per year, his pension would be thirty times 1½ per cent, or 45 per cent of the average pay, or \$900 a year. Other types of employees are cared for in proportion.

## Experts on Exports Moved to New Jobs

**General Motors Sends H. G. Zimmerman to Denmark—Promotion for P. F. Cooper**

NEW YORK, Aug. 1—The announcement was made here to-day by the General Motors Export Co., that H. G. Zimmerman, who for some time has headed the Australasian division of the company, had left New York for Copenhagen, where he will act as district representative. P. F. Cooper, formerly district manager for the company at Wellington, New Zealand, becomes the new head of the Australasian division, which also exercises jurisdiction over South African sales, with offices here.

The movement of several other representatives of the company also was announced. W. J. Mougey, district representative at Singapore, and Paul Hughes, district representative at Colombo, Ceylon, have returned to the United States for a tour of the factories. A. Williams, district manager at Johannesburg, South Africa, will sail from New York on Aug. 5 to return to his station, following two months spent here.

Improving automotive conditions throughout much of continental Europe was reported to the company by L. M. Rumley, chief of the European division, who has just returned after a two months tour through the Scandinavian countries, Belgium, France, Spain and Germany. Rumley is of the opinion that the automobile market is showing itself to be one of the first in Europe to come back, and the company, which for some time has reported increased interest from the continent, looks for an improvement there.

In announcing the movements of its personnel, officials of the export company declared that most sections of the world were showing a business betterment, although it was said that Java yet had on hand some stocks of unsold trucks. Sales have quieted down somewhat during the summer months, as has been customary in other years, but with the approach of the spring and summer seasons in countries south of the equator, including Australia, South Africa, Argentina, and others, a good volume of business is expected.

## Stevens-Duryea Plant to Be Kept Running

SPRINGFIELD, MASS., July 31—Harry G. Fisk and Frank H. Shaw, receivers for Stevens-Duryea, Inc., Chicopee Falls, have filed their inventory in the Superior Court here. The statement of assets gives as valuation under forced liquidation, \$349,644, and fair valuation as a going concern, \$1,242,437. Of the first-named total, \$239,021 is in the plant property, \$88,059 in cars, parts, materials, supplies and scrap and the bal-

ance in notes receivable, accounts receivable and cash on hand.

Receiver Shaw expressed the opinion that the plant should remain in operation, and said it was planned to continue the present production of six cars a week, with 220 men employed.

There will be no immediate reorganization, the receivers continuing their process of enforced liquidation with the expectation that a substantial dividend will be paid the creditors. It is guaranteed that there will be no price change on the cars before Jan. 1.

## Dodge Makes Plans for Canadian Plant

DETROIT, Aug. 1—Plans for the erection of a Dodge Brothers factory in Windsor have not yet reached a point where the company will make an announcement of its plans or the extent to which it will go in a Canadian investment, but it is definitely determined that the company will build soon. The property obtained is at the west end of Windsor, an option having been taken on it about a year ago. The former owner was M. G. Campbell, manager of the Windsor branch of the Kelsey Wheel Co.

The system of incorporating certain Canadian made parts into the Dodge Brothers cars exported into that country will be continued for the present, the lease the company holds on the Canadian Pacific dock remaining, though subject to cancellation.

The new factory will provide for an all Canadian built car, it is understood, and will not be assembled from parts made in the Detroit plant.

## Walker Refinancing Talk Again Revived

CLEVELAND, Aug. 1—The refinancing of the H. J. Walker Co., manufacturer of automobile engines, which has been the subject of several movements since the first of the year, has again become a live issue in local automobile circles.

The refinancing was about accomplished some months ago by the proposed merging of several companies, but the whole deal fell through when certain orders that had been obtained for Walker engines to keep that plant going at capacity were cancelled.

The refinancing has been revived lately. On Saturday, July 29, financiers and executives of Walker were in session several hours, but no announcement was made at the close of the meeting. Some of the strongest men financially in the city are back of the movement and it is likely that an announcement of the completion of refinancing plans will be made shortly.

## DURANT CLOSING STOCK BOOKS

NEW YORK, July 27—Representatives of the Durant corporation have been informed that no more stock of Durant Motors, Inc., will be sold after August 5 to anyone at any price.

## July Record Month in Tire Production

**More Casings Made Than Ever Before in History of American Industry**

AKRON, Aug. 1—July was the biggest month for production in the entire history of the rubber tire industry of America.

The Akron district alone during July turned out tires on a basis of 33,000,000 a year, July production here being in excess of 2,750,000 casings. On this basis of production and upon the basis of present tire requirements, these figures mean that at their present pace of production Akron district tire companies can meet practically the entire needs of the world.

With July's astounding production figure, tire output in the Akron area for the first seven months of the current year is estimated to have exceeded 11,000,000. Tire output was considerably less during the first three months of the year than during the following three months but from Jan. 1 steadily climbed, making conservative the 11,000,000 production estimate.

Daily production continues at about 107,000 tires a day here. This is a climb up from 85,000 a day six weeks ago, the increase in demand for tires which necessitated the heavier output coming at a time when practically all tire producing companies were "sitting tight" and were prepared for a seasonal slump in sales. But the falling off of sales failed to materialize when, according to all the laws of the industry, based upon a study of every year's ebb and flow of production, there should have been a diminution of sales.

## Fabric on Wane

Whether this slump will come in August manufacturers now are not prepared to say.

Production rapidly is swinging to the cord tire. In fact the fabric seems to be on the wane, bearing out the predictions made by several of the tire industry's veterans. Manufacturers say the day is coming when fabric tires will be practically extinct. When that time comes, they say, with production concentrated upon the cord tire almost exclusively, new methods will be developed so as to permit a far lower price on the cord casing.

## GERMAN SHOW CALLED OFF

BERLIN, July 16—Germany will not hold an automobile show during 1922. The show and race which had been announced for Sept. 25 to Oct. 3 has been definitely abandoned, because of strikes and the generally confused political situation.

Present plans call for a show in the spring of 1923.



## More Pacific Coast Assembling Plants

### Manufacturers Locating Around San Francisco Bay—Oakland an Automotive Center

SAN FRANCISCO, CAL., July 31—The automotive manufacturing and assembling industry is more active in the cities around San Francisco Bay than it has been at any time within the past five years. The Chevrolet Motor Co. of California has applied to the city council of Oakland for permission to close certain streets in order to provide more ground on which to erect extensive additions to its assembly plant, already the largest of its kind on the Pacific Coast.

The plan of the company, as revealed to the council, is for an expansion to twice the size of the present plan, with an expenditure of approximately \$100,000 for building alone. The new unit will be used almost exclusively for construction of bodies for closed cars, to obviate the present shipment of these bodies from the factories in Cleveland and Detroit. The new unit, according to W. C. Williams, manager of the plant, will employ between 300 and 350 men.

Announcement also is made that the Associated Motor Industries, of which W. I. Ohmer of Dayton, Ohio, is chairman of the board of directors, will establish one of five assembling plants at Oakland.

#### Durant Oakland Plant Ready

The plant of the Durant Motors Co. at Oakland, on which construction work was started last November, and which has cost to date approximately \$1,000,000, is ready to start production of cars, according to an announcement. The factory is located on an 18-acre site and is connected by three spur tracks with the main line of the Southern Pacific Railroad, with the spurs so placed that 20 cars can be loaded or unloaded simultaneously. There is a floor space of 300,000 square feet in the factory, and an equal amount of space can be added without interfering with active operation if, at any time, this addition becomes necessary.

The Indiana-Pacific Motor Truck Co. will erect an assembling plant in San Francisco this year, according to C. M. Menzies, of this city, who has charge of all territory west of Denver for that corporation.

#### J. & B. PETITIONS AGAINST RICO

PITTSFIELD, MASS., Aug. 1—J. & B. Mfg. Co. has petitioned the Superior Court for a temporary injunction to restrain the Rico Ignition Co. from advertising and selling coils, plates and bases made by the latter concern and described as master coils adaptable to any automobile. It is claimed that the device is an unlawful imitation of one manufactured by the petitioner. Both concerns are of Pittsfield, and the head of the

## SALES BY M. A. M. A. MEMBERS FOR FIRST SIX MONTHS AGGREGATED \$187,500,000

NEW YORK, Aug. 1—Sales by members of the Motor and Accessory Manufacturers Association for the first half of 1922 aggregated \$187,500,000, as compared with \$113,000,000 for the same period in 1921. Sales for June of this year were nearly double those of June, 1921. Business was almost on the same level as in May.

While business has been climbing upward there has been a sharp decrease in the volume of past due accounts. The total at the end of June, 1921, was \$4,720,000 and at the end of last June it was nearly \$2,840,000.

The following table shows the sales by members of the association, the total of past due accounts and the total of notes held for all the months of 1921 and the first six months of 1922:

	Total Sales	Per Cent Change	Total Past Due	Per Cent Change	Total Notes Outstanding	Per Cent Change
1921						
January	\$6,264,587		\$8,099,727		\$4,359,871	
February	10,408,962	66.15 Inc.	6,717,165	17.07 Dec.	6,063,118	39.08 Inc.
March	20,120,386	93.30 Inc.	5,603,992	16.57 Dec.	5,069,877	16.38 Dec.
April	26,746,580	32.93 Inc.	5,352,271	4.49 Dec.	5,371,086	5.94 Inc.
May	26,781,350	.13 Inc.	4,505,176	15.64 Dec.	4,460,355	16.77 Dec.
June	22,703,414	15.19 Dec.	4,720,973	4.79 Inc.	4,012,670	10.37 Dec.
July	23,096,214	1.68 Inc.	5,242,046	10.79 Inc.	3,690,154	7.90 Dec.
August	23,397,640	1.31 Inc.	4,348,790	17.06 Dec.	3,494,510	5.30 Dec.
September	23,141,891	1.09 Inc.	4,358,545	.22 Inc.	3,677,500	5.24 Inc.
October	22,053,327	4.70 Dec.	4,512,680	3.54 Inc.	3,463,500	5.82 Dec.
November	18,998,490	13.85 Dec.	4,352,900	3.56 Dec.	3,661,900	5.73 Inc.
December	14,349,750	24.47 Dec.	4,220,450	3.02 Dec.	3,384,250	7.58 Dec.
1922						
January	17,320,000	20.61 Inc.	4,450,000	5.45 Inc.	3,146,000	7.02 Dec.
February	22,720,000	31.17 Inc.	4,070,000	8.57 Dec.	3,483,000	10.74 Inc.
March	28,670,000	26.14 Inc.	2,890,000	28.86 Dec.	2,657,000	23.69 Dec.
April	33,830,000	18.07 Inc.	3,000,000	2.00 Inc.	2,500,000	1.5 Dec.
May	43,700,000	28.06 Inc.	2,900,000	2.75 Dec.	2,450,000	6.5 Dec.
June	42,000,000	3.85 Dec.	2,840,000	1.25 Dec.	2,320,000	5. Dec.

Rico was formerly an officer and engineer for the J. & B. Co.

### Chevrolet May Beat Production Record

NEW YORK, Aug. 1—Analysis of passenger car production figures for the first half of 1922 shows that Ford produced only about 40 per cent of the total, as compared with about 65 per cent in the same period last year. Ford's output for the six months was about 375,000.

It is interesting to note that in the same period the Chevrolet Motor Co. produced approximately 100,000 cars. It now appears practically certain that Chevrolet will establish a record this year for the biggest production in history next to Ford.

The best previous mark was made by the Willys-Overland Co. in 1916, with a total of 140,000.

### Work on Locomobile Plans Moves Forward

BRIDGEPORT, CONN., Aug. 7—Under Durant leadership and with Col. E. H. Havens at the head of affairs as general manager, the work of reorganizing the Locomobile plant here is proceeding rapidly.

No radical changes in design are contemplated by D. G. Roos, former chief engineer, who is at the head of the consolidated engineering and production departments but it is said that production will be speeded up. The factory has been turning out four cars a day and it is thought possible to increase this slightly. A possible increase in price also is being considered.

### New Name Selected for Highway Board

WASHINGTON, Aug. 1—For the sake of simplicity and euphony, members of the Highway and Highway Transport Education Committee have voted by referendum to change its name to the Highway Education Board, it was announced here. No change in the personnel of the board or in its functions is contemplated, it was said. Dr. Tigert, who is United States Commissioner of Education, remains as chairman.

Fundamental problems involved in highway transport and highway economics are discussed at length by leading students from engineering and automotive fields in a new booklet now ready for distribution by the Highway Education Board.

Modification of truck design to fit the road, subsidizing of highway transport by the construction of market lanes, predictions of future traffic changes and economical types of roads are only four of nearly two score problems raised and discussed authoritatively in the bulletin.

#### SAMUEL H. CARPENTER DIES

LANSING, MICH., July 31—Samuel H. Carpenter, president and general manager of the Atlas Drop Forge Co., died suddenly last Friday. Although Mr. Carpenter had been ill for a time lately, he had appeared to be improving in health. When the forge company was formed in 1906, Mr. Carpenter was general manager and three years ago he assumed the presidency. He also was a director of the Federal Drop Forge Co.

## Japan's Activities Disturb Tire World

### Belief at Akron Flowery Kingdom Is After South American and Australian Business

AKRON, Aug. 1—Foreign countries, more particularly Japan, are making a strong bid for rubber and automobile tire business in South American and Australian fields in direct competition with American export business to those countries. Whether or not they will succeed in giving American manufacturers and exporters sufficient stiff competition to wrest from America most of her export business will depend upon future developments.

Akron export experts of rubber companies in a recent analysis of foreign trade competition, say that Japan's activities in the rubber industry, cloaked with secrecy, are puzzling them. While tire production and sundry rubber goods production have been slipping in Germany, Japan quietly has increased her rubber manufacturing business, the Japanese importations of crude rubber having jumped from 1265 tons in 1913 to 22,500 tons last year.

#### Keen Competition Expected

The automobile registration in Japan has not increased sufficiently to account for this unusual consumption of rubber there, and American rubber exporting authorities say they look for keen Japanese competition within a short time, for the question upon their lips—and a question as yet not satisfactorily answered—is "What is Japan doing?"

Germany appears to be slipping insofar as the rubber industry is concerned. In 1913 Germany manufactured 1,300,000 automobile and truck tires. Last year Germany's tire production was a scant 1,500,000. In view of the heavy growth of the automotive industry since 1913 and the increased use of the automobile in eight years time, this is a substantial loss rather than a gain for Germany, with production based upon proportioned demand and possible sales.

#### U. S. Imports 45.6 Per Cent

To illustrate Germany's back sliding in the rubber business, Germany in 1913 imported 14.5 per cent of the world's total crude rubber output while the United States imported and consumed 45.6 per cent of the world's total output. In 1921 the German importation and consumption was 7 per cent of the world's supply as against 60.8 per cent consumed in the United States.

Germany's actual tonnage of crude rubber imported in 1913 was 16,525 tons, as compared to 20,725 tons last year. Thus, while the tonnage has slightly increased, the percentage of the total rubber supply has decreased materially.

French manufacturers, like all of France, waiting on the German reprisals,

have been losing ground rather than keeping pace with the steady industrial growth of the world. French importations of rubber in 1913 were 5751 tons, as compared to 15,064 last year. American consumption of crude rubber was 53,092 tons in 1913 and 191,702 tons last year.

## 5-Passenger Phaeton Now Part of Reo Line

LANSING, Aug. 2—A new 5-passenger phaeton has been added to the Reo line. The chassis is the standard T-6, but the regular furnishings and equipment are considerably augmented. The price is \$1,745.

The car is equipped with 32 x 4 in. steel disk wheels, and the body itself is of the semi-sport type. The body is somewhat narrower than the standard 7-passenger body and will comfortably carry four or five passengers. The finish is in dark blue, striped with ivory and the trimming is Spanish gray, hand buffed leather. The seats are so arranged that passengers sit low in the body in a comfortable position.

The top is of new design, with gray interior trimming, and the windshield has the lower half stationary. The upper half is arranged to swing in either direction. The windshield is fitted with side wings, as standard, these being in the form of heavy nicked braces, supporting the entire shield, and making a more convenient means of attaching the side curtains. A cowl ventilator is standard equipment and aluminum molding is fitted at the back of the hood, where it joins the cowl at the body. There are seven polished aluminum guard bars on back panel of the body.

The headlights are of a new design with a nickel bail or handle and fitted with dimming lenses. There is a combination parking light and automatic stop signal on the rear.

Other standard equipment includes Moto-Meter, radiator cap with ball handles, clock, front and rear bumpers, aluminum step plates on the running boards, and radiator finished in nickel with polished front.

## G. M. Gillette Quits As Tractor President

MINNEAPOLIS, Aug. 3—George M. Gillette, president of the Minneapolis Steel and Machinery Co., maker of the Twin City Tractor, has resigned, but remains a member of the executive committee and of the directorate. His successor has not been named. Gillette said that after 40 years hard work he would take a rest.

For 20 years he has been an officer in the company. Twelve years previous to his going with the Minneapolis company he was secretary and treasurer of the Gillette-Herzog Co., succeeded by the American Bridge Co.

## Personnel Is Named of Star Motors, Inc.

### Carroll Downes of Durant Becomes Vice-President and General Manager

NEW YORK, Aug. 2—Carroll Downes, vice-president of Durant Motors, Inc., and president and general manager of the Durant Motor Co. of Michigan, has been named by W. C. Durant as president and general manager of Star Motors, Inc., the personnel of which has just been announced. C. F. Daly, who also is assistant to the president of Durant Motors, has been selected as vice-president of Star. W. W. Murphy, treasurer of Durant Motors, will serve in the same capacity with the Star company, while Secretary H. F. Herbermann of Durant Motors will have the same title with Star.

Star common will be placed on the market for the first time on Aug. 10. It will be listed at \$15 a share and sold in lots of from five to fifty under the Durant plan—no cash transactions, but a monthly installment system. It has not been announced as yet how many shares will be offered at the start, but it is expected the Star will have 50,000 shareholders before the end of the sale.

#### Flint Company Incorporates

DETROIT, July 31—Articles of incorporation of the Flint Motor Co., the formation of which was announced by W. C. Durant, have been filed at Lansing. The company, according to its statement, is to make a six-cylinder car at Flint, the price of which will be \$1180 in the touring car model. The company will have 500,000 shares of no-par value stock to sell for not less than \$10 a share. Preferred stock will total \$10,000. The articles state that \$10,000 has been subscribed and \$1,500 paid in. The incorporators are listed as W. C. Durant, C. F. Daly, Carroll Downes, H. F. Herberman and W. W. Murphy.

## R. R. Priority May Affect Production

(Continued from page 236)

products, but even if there should be a car shortage it would cause no great concern. The automotive industry has learned how to deliver its products on their own wheels under their own power, although it involves some inconvenience. It delivered nearly 80,000 vehicles in this way in March, 1920, when rail congestion was most acute.

The most disturbing factor in the present situation, therefore, is not lack of demand but the possibility that supplies of steel may be shut off. If steel comes through cars and trucks will go out. If there is a serious slump in production it will be the result of inability to obtain supplies of essential materials.



## Men of the Industry and What They Are Doing

### Switzer on Executive Committee

Maurice Switzer, vice-president of the Kelly-Springfield Tire Co., has been added to the executive committee of the advertising managers council of the Motor and Accessory Manufacturers Association. He has consented to speak at the Buffalo convention of the association in September on the "Anomalous Position of the Average Advertising Man." Switzer takes the stand that the position of advertising manager is one of the most important in any company and that the man who fills it should take high rank among the executives. Switzer went with the Kelly-Springfield company in 1914 to organize its advertising department and was elected a vice-president two years ago.

### Henry Lord with Velie

Henry Lord, former vice-president and treasurer of the Moline Plow Co., has joined the executive personnel of the Velie Motors Corp. and will assume his duties Sept. 1. The nature of his work has not been stated. Lord was with the Moline Plow ten years and for six years was vice-president and treasurer. He and Mrs. Lord are on a motor trip to Plymouth, Mass., during August.

### Weber Leaves Bankers Security

Fred A. Weber, Jr. has resigned as assistant treasurer of the Bankers Commercial Security Co. of New York, one of the largest national automobile financing companies. He will leave Aug. 15 and will take a much needed rest before accepting one of the several offers he has under consideration. Weber was one of the organizers and the second president of the Automobile Financing Creditmen's Association of New York. He now is president of the National Association of Automobile Financing Companies. He went with the Bankers Commercial four years ago as credit man after serving for some time in the credit department of the Liberty bank which is now the New York Trust Co.

### McNaughton Sales Manager

Announcement is made by the Hendee Mfg. Co. of the appointment of J. B. McNaughton as sales and advertising manager. McNaughton has been connected with the Indian organization for 14 years, the last three as sales promotion manager. A. A. Anderson of the same organization assumes the duties of assistant sales manager and E. W. Stack as assistant advertising manager.

### McMillan with Kardex

A. G. McMillan has been appointed director of sales of the American Kardex Corp. He recently resigned as director of sales from the Mitchell Motors Co., Inc., and several years previously was

with the Fairbanks Co. Paul C. Lott recently sales promotion manager for the Mitchell company has assumed a similar position with the Kardex company. Fred T. Yaeger, who was western sales manager for Mitchell, will manage the newly created automotive sales division for the Kardex organization.

### Changes With Klaxon Co.

Campbell Wood, formerly representing the wholesale division of the Klaxon Co. in the States of Missouri, Kansas, Oklahoma, Texas, Colorado and New Mexico has become a sales representative of the motor equipment division of that company with headquarters in Detroit. T. B. McBride, recently connected with the Peden Iron & Steel Co. at Fort Worth, Texas, succeeds Wood. E. V. Scotford, previously of the advertising and sales promotion department of the United States Tire Co. is now acting advertising and sales promotion manager of the Klaxon company.

### Promotion for Blakiston

Thomas B. Blakiston, who was formerly assistant general sales manager, has been appointed general sales manager of the American Hammered Piston Ring Co. of Baltimore.

### Beaudette Leaves Company

Alpha J. Beaudette, a member of the O. J. Beaudette Co., has left the organization on accession of the Fisher Body Corp., the new owners, and will take a vacation trip to the Yellowstone with his family and his father, M. J. Beaudette, also a member of the company. A. J. Beaudette is considering several connections.

### Delco Promotes Christopher

George T. Christopher has been appointed general superintendent of the Dayton Engineering Laboratories Co., being formerly assistant superintendent and production manager. He is a graduate of the Rose Polytechnic Institute. Christopher's special work with Delco was the operation of the manufacturing division.

### Tinsman in Own Business

E. H. Tinsman, former comptroller of the Oakland Motor Car Co., has opened an agency for the Cadillac and Nash cars at Jackson, Mich. W. A. Sullivan, also formerly with the Oakland, in the advertising department, is associated with him.

### Burke Quits Thomart

S. E. Burke, sales manager of the Thomart Motor Co. of Kent, Ohio, has resigned from that organization.

### Hardy on Vacation

DETROIT, Aug. 2—A. B. C. Hardy, president and general manager of the Olds Motor Works, is taking his fourth vacation in 30 years. He left for Pittsburgh Monday, where he will speak to a meeting of Olds Pennsylvania dealers, following which he will confer with President Pierre S. duPont of General Motors Corp. in New York.

### Gilchrist Touring East

E. H. Gilchrist, general sales manager for the Westcott Motor Car Co. of Springfield, Ohio, is making a trip through the East visiting district managers and distributors in New York, Boston and other points.

### Ackerson With Saxon

Charles Ackerson, formerly manager of the Precision Die Castings Co. plant at Pontiac, is now associated with the sales department of the Saxon company.

## Stephens Organizes As Separate Company

FREEPORT, Ill., July 30—Establishment of the Stephens Motor Car Co., Inc., as a separate organization, although subsidiary to the reorganized Moline Plow Co., has been completed.

All production activities, including accounting, service and similar features, will continue in Freeport under direction of H. J. Leonard, for many years general manager of the company, who has been made vice-president in the new corporation. O. P. Robb, another vice-president and active many years in the sales and territory problems of the company, will be sales manager with offices in Moline, Ill., under direction of R. W. Leo, second vice-president. Robb succeeds C. Roy Clough, many years director of sales for the Stephens car. Preston Boyd, another veteran Stephens employee, is assistant treasurer.

Otherwise officers of the Stephens Motor and including the board of directors follow closely the official makeup of the Moline Plow Co.

### NEW TRUCK COMPANY FORMED

GRAND RAPIDS, Mich., Aug. 2—United Motor Products has been incorporated here to build two truck models, one under 1 ton, the other from 1 to 2 tons.

The officers of the company are: F. T. Hulswit, president; Harry Green, vice-president in charge of finances, and G. R. Wilbur, vice-president and general manager. Hulswit is president of the United Light & Railway Co. of Grand Rapids. Wilbur for the last eight years has been with the Republic and Ruggles companies. A. G. Boone, formerly chief engineer of the Ruggles company, will be in charge of manufacturing and engineering production.

## PRICES REDUCED BY MANY COMPANIES

### Buick's New Prices Show \$30-\$220 Drops

**Four Cylinder Touring Now \$885  
and Six Cylinder Touring  
\$1,195**

DETROIT, Aug. 1—The Buick Motor Co. announces new price reductions which range from \$30 to \$220 on all models. The four-cylinder touring car has been dropped \$50 to \$885, while the 6 five-passenger touring car list is lowered from \$1,395 to \$1,195. The seven-passenger is changed from \$1,585 to \$1,435.

There are two new models in the line, the four cylinder touring sedan at \$1,325 and the six-cylinder touring sedan at \$1,935. The changes follow:

#### Four Cylinder Models

No.	New Price	Old Price
34 Roadster .....	\$865	\$895
35 Touring .....	885	935
36 Coupe .....	1,175	1,295
37 Sedan .....	1,395	
38 Touring Sedan .....	1,325	(new)

#### Six Cylinder Models

No.	New Price	Old Price
44 Roadster .....	\$1,175	\$1,365
45 Touring (5-pass.) ..	1,195	1,395
49 Touring (7-pass.) ..	1,435	1,585
54 Sport Roadster .....	1,625	1,785
55 Sport Touring (4-pass.) .....	1,675	1,785
41 Touring Sedan .....	1,935	(new)
47 Sedan (5-pass.) .....	1,985	2,165
48 Coupe .....	1,895	2,075
50 Sedan (7-pass.) .....	2,195	2,375

### Chevrolet Announces All Prices Reduced

FLINT, MICH., Aug. 1—Chevrolet Motor Co. has announced price reductions on its line of passenger and commercial models effective to-day. The following is the schedule:

#### Passenger Models

Model	Old Price	New Price
Model Superior Roadster	\$525	\$510
Model Superior Phaeton	525	525
Model Superior Utility Coupe .....	720	680
Model Superior 4-passenger Coupe .....	850	840
Model Superior Sedan ..	875	860
Model F. B. Roadster .....	975	865
Model F. B. Phaeton .....	975	885
Model F. B. Coupe .....	1,575	1,325
Model F. B. Sedan .....	1,575	1,395

#### Commercial Models

Model	Old Price	New Price
Model Superior Chassis ..	\$525	\$425
Model Superior Light Delivery .....	525	510
Model G. Truck Chassis ..	745	650
Model T. Truck Chassis ..	1,125	1,095

#### NEW OAKLAND LIST

DETROIT, Aug. 1—The Oakland Motor Car Co. has announced price reductions on all models ranging from \$100 to \$200 effective to-day. The company has brought its roadster and tour-

ing car to \$975 and \$995 respectively, thereby giving General Motors a six-cylinder car in the less than \$1,000 class. The old and new prices follow:

Model	Old Price	New Price
Chassis .....	\$895	\$795
Roadster .....	1,120	975
5-pass. Touring .....	1,145	995
4-pass. Touring .....	1,265	1,165
2-pass. Coupe .....	1,285	1,185
4-pass. Coupe .....	1,685	1,445
Sedan .....	1,785	1,545

President George E. Hannum declared the new prices are predicated upon the ability of the company to sell a fixed or a given number of cars during the fiscal year. The 15,000 mile written engine guarantee will be continued.

### Nash Motors Announces New Prices on Full Line

KENOSHA, WIS., Aug. 2—Price reductions ranging from \$50 to \$200, effective to-day, are announced by the Nash Motors Co. The biggest cuts are on the two closed jobs in the 6-cylinder line, and the smallest on the two open types in the 4-cylinder field. The new list is as follows:

#### SIX CYLINDER

	Old Price	New Price
5-pass. phaeton .....	\$1,390	\$1,240
7-pass. phaeton .....	1,540	1,390
Sedan .....	2,390	2,190
Coupe .....	2,090	1,890
Roadster .....	1,360	1,210
4-pass. sport .....	1,545	1,395

#### FOUR CYLINDER

	Old Price	New Price
5-pass. phaeton .....	\$985	\$935
Roadster .....	965	915
Coupe .....	1,485	1,385
Sedan .....	1,645	1,545
Cab .....	1,295	1,195
Carriole .....	1,350	1,275

#### HENDEE REDUCES PRICES

SPRINGFIELD, MASS., Aug. 1—The Hendee Manufacturing Co. announces a new schedule of prices on the Indian motorcycle. The prices are as follows:

	Old Price	New Price
Scout (non elec.) .....	\$315	\$250
Scout (elec.) .....	345	285
Standard (non elec.) ..	335	275
Standard (elec.) .....	370	310
Chief (elec.) .....	435	325

#### HARLEY-DAVIDSON LOWER

NEW YORK, July 31—Harley-Davidson Motor Co. has announced a price cut on its 1923 motorcycle models. Prices are as follows:

Model	Old Price	New Price
23-F .....	\$335	\$285
23-J .....	365	305
23-FD .....	360	310
23-JD .....	390	330

#### NEW PRICE FOR OLD RELIABLE

CHICAGO, July 31—The Old Reliable Motor Truck Co. has reduced the price of its model D 5-ton truck from \$5,250 to \$5,000.

### Studebaker Makes General Price Cut

**Reductions Announced on All  
Models Ranging from  
\$70 to \$300**

SOUTH BEND, IND., Aug. 2—Substantial price reductions have been announced by the Studebaker Corp. of America on all its models, effective Aug. 1. The reductions range from \$70 to \$200 on the light sixes and \$175 to \$300 on the special sixes and \$135 to \$225 on the big sixes. The new schedule is as follows:

#### Light Sixes

	Old Price	New Price
Chassis .....	\$875	\$785
2-pass. roadster .....	1,045	975
Phaeton .....	1,045	975
Coupe .....	1,375	1,225
Sedan .....	1,750	1,550

#### Special Sixes

	Old Price	New Price
Chassis .....	\$1,200	\$1,000
2-pass. roadster .....	1,425	1,250
Phaeton .....	1,475	1,275
4-pass. roadster .....	1,475	1,275
Coupe .....	2,150	1,875
Sedan .....	2,350	2,050

#### Big Sixes

	Old Price	New Price
Chassis .....	\$1,500	\$1,300
Phaeton .....	1,785	1,650
Speedster .....	1,985	1,785
Coupe .....	2,500	2,275
Sedan .....	2,700	2,475

### Chandler and Cleveland Both Revise Their Lists

CLEVELAND, Aug. 2—Price changes in both the Chandler and Cleveland lines were announced to-day. With the Cleveland the drops ranged from \$10 to \$100 and with Chandler from \$20 to \$300. The new lists are as follows:

#### CHANDLER

	Old Price	New Price
5-pass phaeton .....	\$1,595	\$1,495
4-pass. Chummy roadster ..	1,595	1,495
2-pass. roadster .....	1,595	1,495
7-pass. phaeton .....	1,695	1,645
Dispatch (open) .....	1,695	1,645
Royal Dispatch .....	1,795	1,745
Coupe .....	2,295	1,995
5-pass. sedan .....	2,395	2,375
7-pass. sedan .....	2,395	2,295
Limousine .....	2,995	2,895

#### CLEVELAND

	Old Price	New Price
5-pass. phaeton .....	\$1,195	\$1,095
Chesterfield .....	1,295	1,260
2-pass. roadster .....	1,175	1,085
Sedan .....	1,595	1,585
Coupe .....	1,550	1,495



## MAKERS WATCH EFFECT OF REVISIONS

### No Price War Seen as Result of Cuts

#### No Companies Will Face Possibility of Making Unsatisfactory Profit

NEW YORK, Aug. 2.—Financial interests appear to be much perturbed over August price cuts already announced by Buick, Studebaker, Olds, Oakland, Nash and Chevrolet. They seem to feel that these reductions will inaugurate a period of such competition that the companies may have difficulty in making a satisfactory profit.

There seems to be small basis for undue alarm on this score. Competition is not likely to be any more keen in the next six months than it has been in the past six and the price changes which have been made by the lines in closest competition do not alter their relative positions materially. All these reductions have been based upon expectations of quantity production and, unless all signs fail, these expectations will be realized, although it is improbable sales for the remainder of the year will be as large as in the first half. It is significant that the largest cuts have been made in the closed car field and that reductions on open models are comparatively small.

#### Plenty of Business

While competition will continue to be exceedingly sharp, there is small likelihood of anything resembling a price war. There seems to be enough business to go around and none of the companies proposes to operate at a loss. By increasing volume of production, they are cutting down their overhead and manufacturing costs sufficiently to offset any stiffening in material prices, except that which is of a temporary nature resulting from the mine and rail strikes.

Disregarding Chevrolet, which stands in a class by itself next to Ford, the keenest competition at this time is among Buick, Studebaker and Dodge. Close on their heels are Maxwell, Durant and the Nash, with Columbia, Oakland and Dort holding good positions.

#### Buick Led During Quarter

Buick led the race in the second quarter with Dodge fewer than a thousand behind and Studebaker about five thousand behind Dodge. Maxwell production in the second quarter was almost exactly half that of Buick. Durant and Nash were running neck and neck about four thousand behind Maxwell with Durant less than a thousand ahead of Nash. Columbia, with its new light six, is making an excellent showing and sales of

Oakland are forging ahead. Overland, which is the closest price competitor of the light Chevrolet, made an excellent showing in the second quarter but turned out less than 45 per cent as many cars as its rival.

The following table shows the old and new prices, where changes have been announced, for the phaeton and sedan of the lines which now are in the closest price competition.

	5-pass. Phaeton		Sedan	
	Old	New	Old	New
Buick 4.....	\$935	\$885	\$1,395	—
Columbia Light Six..	985	—	1,395	—
Dodge 4.....	880	—	1,440	—
Dort .....	885	—	1,445	—
Durant 4.....	890	—	1,365	—
Maxwell 4.....	835	—	1,485	—
Nash 4.....	985	—	1,645	—
Oakland 6.....	1,145	995	1,785	\$1,545
Studebaker Light Six	1,045	975	1,750	1,550

#### U. S. TIRE LOWERS PRICES

NEW YORK, Aug. 1.—United States Tire Co. has announced price reductions of 10 per cent on cords and 15 per cent on fabrics, with the exception of Ford sizes which remain unchanged.

The new and old prices on the cords are as follows:

	Old Price	New Price
30 x 3½ cl.....	\$19.00	\$14.65
31 x 4 ss.....	30.60	26.45
32 x 4 ss.....	33.75	29.15
32 x 4½ ss.....	44.35	37.70
33 x 4½ ss.....	45.45	38.50
34 x 4½ ss.....	46.80	39.50
33 x 5 ss.....	55.25	46.95
35 x 5 ss.....	58.00	49.30

#### NEW FISK PRICES

NEW YORK, July 31.—The Fisk Tire Co., Inc., has announced a price cut. Excise tax is now included in the list price. The new prices are as follows:

	Old Price	New Price
30 x 3½ Premier Cl. Fabric .....	\$10.85	\$10.65
30 x 3½ Non-Skid Cl. Fabric (oversize)....	14.85	12.85
30 x 3½ Red-Top, Extra Ply Cl. Fabric (oversize) .....	17.85	15.85
30 x 3½ Non-Skid Cl. Cord .....	18.85	15.85
31 x 4 S. S. Non-Skid Cord .....	26.45	26.45
32 x 4 S. S. Non-Skid Cord .....	32.75	29.15
32 x 4½ S. S. Non-Skid Cord .....	42.50	37.70
34 x 4½ S. S. Non-Skid Cord .....	44.50	39.50
33 x 5 S. S. Non-Skid Cord .....	52.50	46.95
35 x 5 S. S. Non-Skid Cord .....	55.50	49.30

#### SAYERS LOWERS PRICES

CINCINNATI, OHIO, July 28.—A price reduction affecting the whole line of Sayers cars has been announced by the Sayers & Scovill Co. The changes are as follows:

	Old Price	New Price
Roadster .....	\$1,695	\$1,645
Phaeton .....	1,695	1,645
Coupe .....	2,795	2,645
Sedan .....	2,795	2,645

### Lower Prices Worry Detroit Factories

#### Reductions Likely to Cause General Holding Off of Buying—August Production

DETROIT, Aug. 2.—With production in July running just seasonably under the three record-breaking spring months, factories in the Detroit district are entering the month of August with considerable anxiety as to the effect of price reductions on the automobile market.

In the opinion of many, the reductions at this time will have the effect of causing a general holding off of buying which will slow up sales this month.

Going into August, practically all factories had a large number of orders ahead and were assured of operation on a nearly capacity scale. There is little hesitation in saying, however, that these orders are subject to heavy reduction under the influence of a price raid, and officials are keeping in very close touch with the situation so that schedules may be quickly altered to meet the rapidly changing conditions.

#### Holding Off on Cuts

There is a seeming tendency on the part of a majority of factories to hold off on price reductions until the effect of the early ones has been considered. Many factories undoubtedly would prefer to maintain their present price positions if it is possible to do it without the sacrifice of their production positions. This situation will not clear itself before the first ten days of the month, and meanwhile the industry will be in a very unsettled condition.

Ford, in July, came through with another record month, the production exceeding the 151,000 figure fixed, and August schedules have been fixed at approximately the same level. Ford domestic sales ran at approximately 135,000 cars and trucks and 10,000 tractors. The tractors showed a slight falling off. With the foreign sales it was said the total would exceed the 151,000 schedule fixed for the month.

#### Factory Output

Dodge operated at close to its 600 a day schedule for the month, piling up orders on its new utility coupé several months in advance of production facilities.

Maxwell operation was at about 50 per cent of its June total owing to manufacturing changes at the plant, which are rapidly being perfected and will permit the company to resume on a schedule of about 300 daily.

The Durant Lansing factory bettered  
(Continued on page 248)

## Car Exports Exceed All for Last Year

### Motor Truck Shipments for First Six Months Reached Total of 5,762

WASHINGTON, Aug. 1—Passenger car exports from the United States and Canada during the first six months of 1922 reached the total of 45,215, a figure well in excess of the foreign trade for all of last year. Motor trucks, during the same period of this year, attained a total of 5762, against an approximate 8000 for 1921.

The half year figures were compiled here to-day as a result of the announcement by the Bureau of Foreign and Domestic Commerce of the export shipments from the United States during the month of June, following the announcement of the Canadian totals for the same month nearly a week ago.

#### 7818 Car Sales in June

The June sales from the United States were 7818 passenger cars, the largest during any month of the year; 1121 motor trucks and parts to the value of \$4,089,772. Each of these items, excepting motor trucks, was above the totals reached during the previous month of May, and the announcements show the improvement that has been made in the general position of the foreign markets for American automotive equipment.

Comparisons are as follows:

	June	Passenger Cars	Motor Trucks
United States..	7,818	1,121	
Canada .....	2,267	170	
Total .....	10,085	1,291	
May			
United States..	6,798	1,203	
Canada .....	2,562	251	
Total .....	9,360	1,454	

#### Shipments from U. S.

The exports of passenger cars from the United States alone, which does not include the shipments of Buick and Chevrolet cars, to practically all parts of the world that are made from its Canadian plant by General Motors, attained the unexpectedly large figure of 31,028 during the first half of this year. For all of 1921 the total was 30,941. The comparison of truck shipments from the United States shows 4711 for the six months of 1922 against 7402 during the twelve months of 1921.

Similar comparisons cannot be made for Canada, as the figures for the 1921 calendar year are not available. The six months' shipments for 1922 show 14,290 passenger cars and 1051 motor trucks. The only comparable Canadian figures are for the eight months ending Nov. 1, 1921, which show 4402 cars and 576 trucks, or for the fiscal year ending March 31, 1922, in which 14,724 passenger cars were shipped from Canada.

## Exports, Imports and Reimports of Automotive Products for June, 1922, and for Nine Months That Preceded

	EXPORTS				IMPORTS				REIMPORTS	
	Month of June		1922		1921		Nine Months Ending June 30, 1922		1921	
	No.	Value	No.	Value	No.	Value	No.	Value	No.	Value
Automobiles including chassis and passenger cars	2,372	\$2,588,724	8,988	\$6,652,549	102,028	\$133,298,925	52,346	\$42,899,200		
Motor trucks and buses, except electric	418	531,234	49	59,044	17,598	29,511,955	2,727	a2,851,223		
Up to 1 ton	780	271,038	.....	.....	.....	.....	b3,280	b1,346,488		
Over 1 and up to 2 1/2 ton	217	230,464	.....	.....	.....	.....	b1,039	b1,407,718		
Over 2 1/2 ton	124	284,777	.....	.....	.....	.....	b383	b917,788		
Total Motor trucks and buses, except electric	418	531,234	1,121	786,279	17,598	29,511,955	7,429	6,523,217		
Passenger cars, except electric	1,964	2,057,490	84,430	103,786,970	a13,708	a12,164,579				
Value up to \$800	.....	.....	5,285	2,528,098	.....	.....	b19,631	b9,374,459		
Value over \$800 and up to \$2,000	.....	.....	2,278	2,539,677	.....	.....	b10,417	b11,542,452		
Value over \$2,000	.....	.....	255	739,451	.....	.....	b991	b3,060,588		
Total passenger cars, except electric	418	531,234	1,121	786,279	17,598	29,511,955	7,429	6,523,217		
Parts, except engines and tires (accessories)	2,211,528	*18,561,601	4,089,772	67,409,570	.....	.....	33,921,737			
Station and warehouse motor trucks	51	40,642	17	14,532	573	341,473	158	165,378		
Trailers	33	15,403	.....	.....	.....	.....	b266	b119,438		
Airplanes	3	19,500	.....	.....	66	465,955	44	151,245		
Parts of airplanes, except engines and tires	7,837	*29,545	12,242	194,440	.....	.....	96,190			
Bicycles and Tricycle	74,691	1,368	12,056	3,497,720	.....	.....	481,034			
Motorcycles	348	98,953	1,973	506,174	24,505	7,730,898	11,512	3,080,685		
Parts, except tires	.....	.....	*204,525	155,865	.....	.....	*1,605,023	914,590		
Gas engines	140	65,173	337	49,412	3,052	643,544	3,270	479,893		
Traction engines (steam) except agricultural	.....	.....	8	6,104	271	478,419	29	57,168		
Automobile engines	542	125,992	8,852	831,401	14,173	2,662,803	33,602	3,955,569		
Aircraft engines	.....	.....	29	19,081	.....	.....	93	48,427		
Complete tractors, except agricultural	35	119,124	28	9,674	19,996	19,792,327	178	266,954		
Other internal combustion engines	586	63,595	817	164,169	14,462	2,485,218	4,927	693,760		
Automobiles	34	63,029	33	39,656	1,051	1,264,108	450	757,269		
Parts, except tires	120,325	.....	45,596	1,376,325	.....	.....	646,189			
All other	7,182	.....	7,369	457,919	.....	.....	225,374			
Automobiles (free of duty)	518	911,785	121	191,654	3,622	5,789,163	2,762	4,345,636		

a July 1 to Dec. 31, 1921.  
b Jan. 1 to June 30, 1922.  
\*Pounds.

General Motors, it should be remembered, began the overseas shipments of its Buick and Chevrolet lines from Canada in November of last year.

#### British Exports Decline

WASHINGTON, Aug. 1—Automobile exports from Great Britain during June totaled £132,379. This represents a decrease in exports of 35 per cent over the month of May, and a decrease of 21 per cent when compared with June, 1921. During June, this year, the automotive

division of the Department of Commerce has been advised 65 passenger cars were exported, representing 48 per cent in number and 53 per cent in value, compared with May exports.

During June there were 27 trucks exported, valued at £21,422—a decrease of 43 per cent in number and 22 per cent in value. Twenty-five chassis were exported during June, representing a decrease of 53 per cent in number and 49 per cent in value, compared with the month of May.



## Willys and Overland Litigation Settled

Receivers of Corporation Agree  
to Accept \$750,000 in  
Three Notes

TOLEDO, Aug. 2—Litigation between the receivers for the Willys Corp. and the Willys-Overland Co. in relation to claims and counter claims was settled in the Federal Court yesterday when all sides agreed to an order by which the Willys-Overland Co. paid to the receivers \$750,000 in three notes. The Willys-Overland Co. also will pay counsel fees.

The intercompany accounts, which are limited to a balance of \$167,197.43 owing to the Willys Corp. by the Overland company, and to a balance of \$189,554.15 owing to the Willys-Overland on its own account and for the Willys Morrow Co. also, by the Willys Corp., will be ironed out by special master Curtis T. Johnson.

The settlement is in the form of three notes, each for \$250,000 to bear interest at 4½ per cent and due serially May 31, June 30 and July 31, 1923.

### Avoids Possible Delay

"The court believes that it has been profitable to both sides of the dispute to avoid litigation," declared Judge Killits from the bench. "The court has had a desire to go into the merits of the case, but great delay probably would have resulted with no better results."

The claims of the Willys Corp. against the Overland company grew out of the sale of common stock to the corporation in 1919, and a contract dealing with the development of the Chrysler six car.

The attorneys finally agreed that it would have been exceedingly difficult to prove fraud in connection with the stock transaction. The sale was approved by stockholders and, incidentally, President John N. Willys personally purchased a large block at the same time, evidencing good faith in the transaction.

The Willys-Overland claims totaling nearly \$5,000,000 were based upon the expenditure made on the Chrysler six which it designed and developed. The Willys Corp. was to manufacture the car in its plant at Elizabeth, N. J., built at a cost of more than \$13,000,000.

The settlement made yesterday practically is all based upon this contract between the two companies. The settlement practically divorces the two companies completely, with the exception that the Willys Corp. receivers still own a block of common stock in the Willys-Overland Co. representing almost a one-third interest.

### No Change in Dealer Policy

TOLEDO, Aug. 1—The sale of the Willys-Overland, Inc., property at Adams and 14th Streets here to Gordon Mather, president of the Mather Spring Co. and director in the Willys-Overland company for approximately \$400,000 is a part of

## STRIKE HITS CHICAGO; MOTOR VEHICLES BOON

CHICAGO, Aug. 1—Motor vehicles provided Chicago's chief means of local transportation to-day following the strike of service lines and elevated trainmen which caused complete suspension of street car and elevated railroad service.

Large downtown department stores and other business houses used motor trucks and privately owned automobiles to bring their employees to work. Persons who drove their own cars usually arrived down town with all seats filled. Motor clubs have urged that all persons driving their own cars accommodate as many passengers as possible.

The first day passed with surprisingly little confusion and showed the possibility of the second largest city in the United States getting along with motor car transportation as a substitute for street railway systems.

the plan to liquidate the holdings of the company in real estate and other assets not used directly in the production of automobiles.

The proceeds of such sales will be used to cancel the bonded indebtedness of the company.

The branch immediately closed a long term lease on the property here, so that its operations and dealer policy will not be altered in the least. Vice-president C. B. Wilson is authority for the statement that no change in dealer policy is contemplated.

Some months ago a general move toward decentralization was made but large branches will be maintained as at present.

From time to time other properties of the company will be sold in accordance with the policy of debt handling announced when the bond issue was put on. Mather has purchased the property as an investment.

### ATLANTA OVERLAND SALES

ATLANTA, GA., Aug. 1—The Atlanta branch of the Willys-Overland Co. announces that Overland sales the past few months in the district covered by this branch have been more than 1100 per cent better than during the same period in 1921.

### ERICSSON PLANT SOLD

BUFFALO, July 25—The plant of the Ericsson Mfg. Co., Buffalo, where Bosch magnetos were made, has been sold for \$250,000 to Edward L. Jellinek at public auction, under orders from the United States District Court. The sale included the entire plant.

It is understood that Jellinek was acting in the interests of the Swedish stockholders of the company.

## Stutz Control Goes to Guaranty Trust

Banks Buy in Ryan Stock at  
Auction at \$20 a  
Share

NEW YORK, Aug. 2—Efforts on the part of Receiver Caffey to force the banks to offer Allan A. Ryan's Stutz stock at private sale having failed, the original plan of selling the securities at auction was followed out to-day. The holdings of the bankrupt financier were put on the block and were bought in at \$20 a share by the Guaranty Trust Co., which purchased all but 1500 of the 134,414 1/3 shares that were offered, the sale of the Stutz property bringing a total of \$2,686,286.06. The odd block of 1500 shares went to the Empire Trust Co. for \$30,000.

### Bank Held Majority of Stock

The Guaranty Trust Co., prior to the bankruptcy proceedings, held the big majority of Stutz stock which had been put up as collateral by Ryan. After the failure the bank announced it would protect itself by means of the auction block, an action that was participated in also by several other banks which held smaller blocks of Stutz stock. Inasmuch as this stock carried with it control of the Stutz company, and the last financial report of the company showed it to be a going concern and prospering, interest in the sale was keen indeed.

As yet the Guaranty Trust Co. has not decided what the next step will be. It is felt that the bankers will retain control and take steps immediately to increase production and sales. If this is not done, in all likelihood there will be a public offering of the shares. A definite decision will not be made until the bank has studied the situation.

### Issue Financial Statement

Preceding the auction by several days, there was held in New York a meeting of the directors of the Stutz company, who issued a financial statement as of June 30, 1922, which shows total fixed assets of \$4,400,089 as compared with \$4,387,114 on Dec. 31, 1921, and total assets of \$6,455,809 as against \$6,553,809 on the first of the year. On the liability side of the ledger the figures read \$25,530 as against \$302,482 on Dec. 31, with a surplus of \$4,473,351 and a reserve of \$555,927 for depreciation. On Dec. 31 this surplus was \$4,777,704 and the reserve \$473,623. Cash on hand June 30 amounted to \$148,468 as against \$63,163 on Dec. 31. Accounts receivable totaled \$256,148 as against \$175,222 and the inventory was \$1,507,450 as against \$1,890,608.

In the way of liabilities \$1,000,000 is charged against the capital stock; notes payable, \$150,000; accounts payable, \$243,062; accrued accounts, \$33,467; reserve for depreciation, \$555,927; surplus, \$4,473,351.

## FINANCIAL NOTES

Gray & Davis, Inc., directors, have completed plans for new financing involving the sale of \$1,000,000 of 7 per cent first mortgage 10-year sinking fund convertible bonds, \$750,000 of preferred stock and 20,000 shares of common stock. The bonds will be sold to a New York-Boston banking syndicate and will be convertible into common at \$20 a share for the next two years, with conversion price rising two points annually to 30 at the end of seven years and continuing to maturity. The preferred stock which also will be convertible into common will be sold to a different syndicate. The sale of 20,000 shares of common stock to private interests for \$250,000 has already been consummated. The stockholders will hold a special meeting to ratify the proposals and to increase the authorized capitalization from 180,000 shares of no par value common to 215,000 shares to provide for possible conversions and for the proposed sale of common. The new financing will give the company nearly \$2,000,000 of cash and will make current assets stand about 3 to 1 to current liabilities.

General Tire & Rubber Co. has declared a regular 2 per cent quarterly dividend which will be paid the first week in August. The company has not passed a dividend since its formation eight years ago. Common stock is quoted at 200. The management reports the largest year's business in units and dollars in the company's history.

Pierce-Arrow Motor Car Co. for the three months ended June 30, 1922, reports a deficit, after interest and Federal taxes, of \$11,766, against \$1,400,550 for the same quarter in the previous year. The deficit for the first quarter of this year was \$25,226. Operating income for the period, after allowing for maintenance and depreciation, was \$348,855, against an operating loss of \$828,866 last year. Interest, Federal taxes and other charges aggregated \$360,621, against \$571,684. Operating income for the first half of this year totaled \$638,929 against the previous loss of \$989,060. Interest, taxes and other charges for the six months amounted to \$675,921, against \$900,992, leaving a deficit of \$36,992, against \$1,890,052 last year.

Maxwell Motor Corp. has retired \$1,750,000 series B notes due June 1, 1923, tenders for which were asked for recently. A large number of the tenders were at a premium and something less than \$2,000,000 were tendered at par.

Mack Trucks, Inc., for the quarter ended June 30, 1922, reports net earnings of \$1,315,634 after maintenance, depreciation and Federal taxes, as compared with \$523,639 for the same period a year ago. Net earnings for the first six months aggregated \$1,570,632, compared with \$528,035 during the first half year of 1921. After the payment of preferred dividends the balance for the six months' period equalled 3.53 a share on the common stock. The balance sheet as of June 30, 1922, shows cash \$3,811,317, contrasted with \$3,464,743 in the corresponding period a year ago, and receivables \$7,858,413, compared with \$5,000,519. The accounts payable were \$2,180,577 on June 30, 1922, and \$1,822,878 on the same date last year. The company has no bank loans and no bonded indebtedness.

Fisk Rubber Co. reports earnings equivalent to 50 cents a share on 743,949 shares of common stock of no par value for the six months ended June 30, 1922, at which time the company had a surplus of \$1,111,191, after interest, amortization, etc. The net

profits amounted to \$1,774,024. The previous surplus was \$1,873,417. The balance sheet as of June 30 shows assets of \$54,793,835 as compared with \$60,604,317 in 1921. Cash is \$3,682,748 as against \$3,229,695 of the previous year. Inventories show a reduction of 30 per cent compared with a year ago and the company has no forward commitments at other than current prices. Stocks are sufficient only for immediate production. There was an increase of 23 per cent in net sales volume over the first six months of 1921 and the unit sales increased 85 per cent.

## BANK CREDITS

*Written exclusively for AUTOMOTIVE INDUSTRIES by the Guaranty Trust Co., second largest bank in America.*

**D**URING last week there was a continuance of easy money with increased ease toward the end of the week. Call loans covered a range of 3 per cent to 4 per cent, as compared with 3 per cent to 4½ per cent in the previous week. In time money the situation was practically unchanged. The rates remained the same as for the previous week: 3¾ per cent to 4 per cent for sixty and ninety days' maturities; 4 per cent for four and five months' and 4¼ per cent for six months'. The prime commercial rate remained at 3¾ per cent to 4 per cent, the same as for the previous week.

The railway and coal strikes, involving the idleness of nearly 1,000,000 men, are still the predominant features in industry and trade. As a result of the situation created there has been reported heavy buying of British coal, from 700,000 to 1,000,000 tons; the blowing out of more blast furnaces; the slowing down of steel-making operations and a rise in pig iron prices.

Car loadings of all commodities except coal during the week of July 15 totaled 783,573 cars. In the history of American railroads this figure has been exceeded only during the weeks of September and October, 1920, and is only 1 per cent below the total for the same commodities loaded during the week of Oct. 15, 1920, when the peak in transportation was reached.

On July 28 the Bank of Germany raised its discount rate from 5 per cent to 6 per cent, this being the first change since December 23, 1914. The general trend of discount rates the world over has been downward for the last few months. In some quarters this reduction by the Bank of Germany is taken to indicate a belated attempt on the part of the German Government to combat inflation, while the official reason for the increase in the rate is reported to be the excessive demand for business credit.

Last week Secretary Mellon issued a call for the redemption on Dec. 15 next of \$1,000,000,000 4¾ per cent Victory Notes, about one-half of the total amount outstanding, and at the same time the offering of a new issue of four-year 4¾ per cent Treasury Notes was announced. This marks another step in the Government's program for distributing its short term debt.

## Lower Prices Worry Detroit Factories

### Reductions Likely to Cause General Holding Off in Buying—August Production

(Continued from page 245)

its production of 100 daily on the Durant fours, and will begin manufacture this month of the Star in addition to the usual total of Durants.

Dort continues on a schedule of 50 to 70 daily.

Buick, with its completely revised line, has set a schedule of 185,000 for the year, a monthly total of about 15,500. This total can easily be reached with additional facilities afforded by the former Scripps-Booth plant, which is to be the closed-car unit of the company. Under pressure, the company can build about 800 cars a day in its Detroit and Flint factories.

Studebaker is continuing at its capacity of 440 daily, having maintained this rate since early in February.

Hudson-Essex operated at the rate of 285 daily in July and plans to continue this figure in August. Hudson reports that its sedan is practically sold out for the balance of the year. The demand for its coach models continues to be a feature of its business.

Paige came through July with an output in both Paige and Jewett models of about 140 daily.

Hupp totals for the month maintained its 140 daily rate.

Columbia has increased its August total to 2000 after building about 1650 in July.

Oldsmobile maintained a schedule of about 100 daily through July, and a similar total was reached at the Oakland plant.

Chevrolet totals kept close to the 1000 daily mark reached by the company in the earlier months.

Reo resumed operation in July, after a two weeks' general vacation period, at a daily rate of about 100 cars and speed wagons.

Liberty continued on its schedule of 30 to 35 daily, and Rickenbacker kept up to its 25 daily total.

The companies producing cars in the higher priced field are continuing heavy production. Cadillac, with about 100 daily, is working at capacity, as is Lincoln, with a daily output of 30 at 35.

Packard total production continues on the 2000 monthly schedule, the single six being sold through to early fall.

Wills St. Claire is planning to add to its schedule of 25 daily.

## FRENCH EXPERT COMING

PARIS, July 20 (By Mail)—Henri Perrot, the recognized expert in Europe on brake problems, and particularly on the use of front wheel brakes, will sail for America this week aboard the steamer "Paris."



## Detroit Now Faced with Coal Shortage

### Plants Dependent on Edison Company for Power Seriously Affected

DETROIT, Aug. 2.—Detroit is now working on what may prove to be a ten day fuel supply. Officials of the Detroit Edison Co. said this week that efforts to obtain adequate coal shipments have been unavailing and that unless arrangements can be made to get coal through at once, it may have to issue a rationing order within ten days.

The establishment of railroad priorities has not up to this time afforded relief, officials said, because of the number of priority applications which have been filled. Until the rights of the many applicants have been established delay will be encountered. Then, too, there is a shortage of cars for coal shipments which still further cuts down the possibility of adequate shipments.

#### May Be Without Power

In the face of the coal shortage, automobile factories which normally operate partly under their own power and partly on power bought from Detroit Edison are throwing the entire load upon the Edison company and are reserving their own fuel supplies for later emergency use. This action will mean only the shortening of the time that the company can give service and will deprive the plants entirely dependent on the Edison company of power at an earlier date.

Factories with independent power plants as a rule have sufficient coal to enable them to operate for from two to three months. If they are able to obtain parts and material they will be able to keep going through to that time if the coal and railway situations continue that long. Delays in deliveries of material are multiplying all the time. Many of the larger car and truck manufacturing plants are issuing questionnaires to their supply sources, asking information on how they are situated for continuance of operation, and what may be expected in deliveries for the immediate future, if the coal and railroad strikes prevail.

#### No Tie-Up in Deliveries

At General Motors offices it was said there were no actual tieups in deliveries of any kind yet, but that the situation demanded that orders be placed well in advance of delivery dates sought and then the shipments followed up closely.

Steel is being obtained in adequate quantities largely by reason of the fact that it was ordered far enough in advance to insure this. Large parts makers declare stocks of fuel and steel now on hand are sufficient for operation over a period of about 30 days.

Steel is coming through all the time, but deliveries are very slow. Priorities on railroad equipment have not had the

effect of slowing up deliveries any more than was experienced in the time preceding the issuance of the priority order.

Conditions on the Canadian side of the river are more favorable for manufacturing than on the American side, but the railroad companies there are operating on a short fuel supply. Factories in the border cities can obtain hydroelectric power indefinitely. Coal is generally short but except for minor manufacturing operations it is not required.

Factories in other Michigan cities are better situated as to fuel supplies, most of them operating their own power plants and having considerable stocks of coal still remaining. Utility companies in many cities, however, are short and it is probable that much of the coal coming into the state in the immediate future will be consigned to the utility companies.

## INDUSTRIAL NOTES

Liberty Mfg. Co., makers of an automatic tire pump, now occupying leased quarters in Des Moines, will establish permanent factory in Mt. Vernon if plans submitted to local investors are accepted.

Mastercrafts' Corp., Brattleboro, Vt., has been formed here to manufacture a new contrivance for cleaning automobile windshields. Contracts for the production of 100,000 of these have been awarded to a company in Elbridge, N. Y. Manufacture of the product here in Brattleboro is contemplated. The principal incorporator is W. E. Stellman, head of the Stellman Machine Shop, and the capital stock is \$5,000.

Jig Bushing Co. of Pontiac is moving from its temporary plant to a new building recently erected for it on the Grand Trunk near the northern boundary of the city. Business of the concern is growing rapidly according to Emmet Paige, who is one of the owners. A new departure in its activities is grinding universal joints, a large contract for this work having been closed during the present week.

Hendee Mfg. Co. has received an order for 1200 motorcycles to be shipped to Australia. The plant is operating a full force, but has cut production 50 per cent by working each member every other day. A desire to keep every man on the payroll is taken as special evidence of the confidence felt in the coming demand for motorcycles.

C. H. Wills & Co. is contemplating an addition to its present plant at Marysville, Mich., to afford 104,000 sq. ft. more of floor space, in order to provide greater facilities for painting and trimming. At present the company is doing all its own painting of roadsters and phaetons. The Illinois Tool Co. plant, purchased by the Wills company, is now being equipped with \$250,000 worth of machinery. This plant will augment its working force by 400 men.

### INJUNCTION FOR APCO

PROVIDENCE, R. I., July 29—A temporary injunction restraining the Hudson Motor Specialties Co. of Philadelphia from alleged unfair advertising and false representations concerning the Apco Manufacturing Co. of Providence has been granted by Federal Judge Arthur Brown, following the hearing.

## METAL MARKETS

Opinion is divided as to the extent to which the steel market will respond to the impairment of output caused by the sharply lessened coal supply and by the difficulties that have recently attended rail transportation. It is only natural that steel producers incline to the belief that their output has been considerably more interfered with than has consumption of their finished product. They have the advantage of statistical proof to back up their view, whereas the great diversity of steel consuming industries make it utterly impossible to calculate the inroads made upon steel consumption by the recent dislocation of the freight movement and the inadequacy of the coal supply. The slowing down of steel consumption can only be sensed, that of steel production can be figured. That there has been a slowing down of consumption is conceded by the producers, but there is naturally a disposition to minimize its extent. Indications, however, are not lacking that the pace at which steel is being worked up into finished products has slackened to practically the same extent as has the rate of steel mills' production. Automotive steel consumers whose eagerness for prompt shipments has been considerably greater than that of any other steel consuming industry have here and there pruned down specifications in accordance with revised production schedules. All in all it would seem as though what dent has been made in the output of steel has been offset by a corresponding diminution in consumption. Most of the steel mills have been far more extensively provisioned with coal than those who buy their product. It appears reasonably certain that during the aftermath of the coal strike and the other industrial disturbances the leading steel market interests will strive to maintain intact the prevailing scale of prices which in transactions with the smaller mills has already become strictly nominal.

**Pig Iron.**—Blast furnace interests are intensely bullish in their views as to the outlook and in support of their predictions of higher prices point to the not inconsiderable number of furnaces that have banked their fires for want of coke. On the other hand, many foundries manage to get along with less pig by the more liberal use of scrap in their melts. Moreover, runaway market conditions are obviated to some extent by the competition of imported pig, so long as prevailing tariff rates remain in force.

**Aluminum.**—Official returns give the stock of aluminum in bonded warehouses on May 31 as 3,011 tons. The general impression in the trade, however, is that there has been considerable addition to this amount in June and July when importations for which orders were despatched from here in May and June were landed. Holdings of aluminum in bonded warehouses a year ago were approximately 15,000 tons. All in all, the visible supply of aluminum of foreign origin in the United States is estimated to be about one-third of what it was a year ago. It is rumored in the trade that the Swiss producers have sold their output for an entire year to American interests, at an agreed upon price, regardless of what rate of duty may finally be enacted into law. Importers of German aluminum stress the difficulty encountered in securing shipments. German export prices are not based upon cost of production plus profit but upon the market prices prevalent in the country to which the material is to be shipped.

# Calendar

## SHOWS

- Aug. 26-Sept. 1—Toronto, Ont., National Automobile Show held in conjunction with the Canadian National Exhibition.
- Sept. 4-9—Indianapolis, Automobile and Accessory Show in conjunction with the Indiana State Fair, Auto Show Building, under the auspices of the Indianapolis Automobile Trade Association, J. B. Orman, manager.
- Sept. 23-30—New York, Closed Car Show, Grand Central Palace.
- Oct. 21-28—Washington, D. C., Annual Closed Car Salon, Convention Hall, under

the auspices of the Washington Automotive Trade Association.

- Nov. 13-18—Chicago, Annual Show and Meeting of the Automotive Equipment Association.
- Dec. 3-9—New York, Eighteenth Annual Automobile Salon, Commodore Hotel.
- Jan. 6-13—New York, National Automobile Show, Grand Central Palace, under auspices of National Automobile Chamber of Commerce.
- Jan. 27-Feb. 3—Chicago, Annual Automobile Salon, Coliseum and First Regiment Army.

## FOREIGN SHOWS

- Sept. 1922—Rio de Janeiro, Brazil, Automobile Exhibition in Connection with the Brazilian Centenary Association Automobilsta Brasileira.
- Sept. 15-20—The Hague, Automobile Show.
- September—Buenos Aires, Argentina, Annual Exhibition, Sociedad Rural Argentina.
- Oct. 4-15—Paris, Automobile Show, Grand Palais.
- Nov. 3-11—London (Olympia), Automobile Show.
- Nov. 10-Dec. 19—Brussels, Automobile Show, Palais de la Cinquantenaire.

- Nov. 29-Dec. 4—London (Olympia), Cycle and Motorcycle Show. British Cycle Motors, The Tower, Warwick Road, Coventry.

- November—Buenos Aires, Argentina, Annual Exhibition, Automovil Club Argentino.

## CONVENTIONS

- August 28-Sept. 2—Detroit National Safety Congress.
- Sept. 18-23, 1922—Rome, Italy, Second Annual Meeting of the International Chamber of Commerce.
- Sept. 13, 14, 15—Buffalo, Lafayette Hotel, Annual credit meeting, Motor and Accessory Manufacturers Ass'n.

## Strikers Will Man Food Truck Trains

WASHINGTON, Aug. 2—Railroad strikers in Washington will set a precedent which may have a far reaching effect upon the use of motor trucks during the transportation emergency. It was learned here to-day that the strikers had volunteered to operate trucks hauling fuel and food supplies in order that the public itself and their own families would not suffer from the tie-up of railroad lines. It is said that the committee representing the strikers in this territory have agreed to assist the Merchants and Manufacturers' Association in the establishment of truck trains to haul coal and provender from points in an extensive radius.

The question arises as to the action which national labor leaders may take in the event the proposed program of local strikers is carried out. The radical element among the union men may insist that the strikers refrain from manning motorized trains, inasmuch as the uninterrupted movement of essential commodities even on a smaller scale may have a tendency to break the strike.

A survey similar to that conducted during the war emergency has been undertaken by business men in order to determine the number of motor vehicles ready for service, whenever a complete tie-up of railroad lines is reached. The rejection of the Harding peace plan by railroad executives has brought relations of the strikers and employers to an impasse.

## Anderson Brings Out Light Aluminum Six

ROCK HILL, S. C., Aug. 2—The Anderson Motor Co. is bringing out a new light aluminum six, the 5 passenger phaeton model of which is to sell at \$1,195. The price on the Series 40 phaeton model is \$1,650. A closed model will be put out later at a price that will be very little in advance of the phaeton model. The new model is shorter than the old one, having a 114 in. wheelbase.

The engine is Continental, Model 6-Y. Other standard parts are Borg & Beck clutch, Salisbury front and rear axles and Westinghouse starting, lighting and ignition.

The springs are semi-elliptic and are 37 in. in front and 57 in. in rear with tapered leaves. The tires are 32 x 4 cord, and the weight of the phaeton model fully equipped is 2450 lb. The construction of the cowl and hood brings the body forward 4 in., which really gives the equivalent of a 118 in. wheelbase in actual body length. The top is clear vision with gipsy side curtains; upholstery is genuine leather.

The headlights are drum type, and a Moto-Meter and Alemite system are part of the standard equipment. The car takes its name from the fact that the body is covered with aluminum on a framework of ash.

The previous line of Anderson models, known as the Series 40, is to be continued along with light aluminum six.

## REPUBLIC ROAD BUILDER TRUCK

ALMA, Mich., Aug. 2—A new road builder truck has been brought out by the Republic Truck Co. This new truck is specially designed for road building purposes, having a 110 in. wheelbase and a turning radius of 15½ ft. It is equipped with pneumatic tires.

The body is mounted low to the ground, while about 40 per cent of the total load is carried on the rear axle.

## WESTCOTT OFFERING NEW CAR

SPRINGFIELD, O., Aug. 1—Westcott Motor Car Co. has brought out a new 7-passenger car known as the larger six equipped with the California type of permanent touring top and mounted on a 125 in. wheelbase. The standard chassis sells for \$1,990. The model with glass sides in solid frame is \$100 additional.

## PISTON RING COMPANY FORMED

DETROIT July 26—The Pelton Piston Ring Co. has been formed in Detroit by E. H. Belknap, Carl H. Pelton, former secretary of the Maxwell-Chalmers companies, and Charles E. Pelton.

## G. M. Report Shows Increased Earnings

NEW YORK, Aug. 2—The financial statement of the General Motors Corp. for the first six months of 1922, ending June 30, has followed the preliminary statement issued two weeks ago. The formal statement does not vary much in essential details except that the auditors have discovered more net earnings on the common stock than was reported in the preliminary statement. Whereas the common's earnings for the first six months were first reported at \$26,839,391, the formal statement gives these profits at \$27,403,428.30.

The balance sheet shows total current and working assets as of June 30 to be \$162,957,714.44 as against \$179,214,317.05 as of Dec. 31, 1921. Total current liabilities on June 30 reached \$40,232,450.98 as compared with \$81,553,967.17 on Dec. 31. The balance sheet in part is as follows:

Current assets, cash in banks and on hand as of June 30, 1922, \$35,527,973.13 and on Dec. 31, 1921, \$40,057,401.53; United States Government bonds on June 30, 1922, \$4,528.04 and on Dec. 31, 1921, \$5,228.04; marketable securities on June 30, 1922, \$30,190.82 and on Dec. 31, 1921, \$27,009.31; sight drafts against B/L attached and c. o. d. on June 30, 1922, \$10,430,382.50 and on Dec. 31, 1921, \$4,677,241.39; notes receivable on June 30, 1922, \$3,278,178.44 and on Dec. 31, 1921, \$4,794,978.99; accounts receivable and trade acceptances, customers and others on June 30, 1922, \$18,620,956.32 and on Dec. 31, 1921, \$18,944,844.09; inventories at cost or market, whichever is lower on June 30, 1922, \$94,166,601.36 and on Dec. 31, 1921, \$108,762,625.35; prepaid expenses on June 30, 1922, \$898,903.83 and on Dec. 31, 1921, \$1,944,988.35.

Current liabilities, reserves and capital are: Accounts payable on June 30, 1922, \$22,184,843.18 and on Dec. 31, 1921, \$15,640,429.41; notes payable Dec. 31, 1921, \$48,974,996.29; taxes, etc., accrued not due June 30, 1922, \$16,979,253.06 and on Dec. 31, 1921, \$15,894,778.40.